InTune™
User Guide

Version 2.2

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  - product name
  - product version (release number)
  - license number and password (trial or permanent)
- operating-system and environment information
  - machine type
  - operating system type, version, and service pack or program temporary fix (PTF)
  - system hardware configuration
  - serial numbers
  - related software (database, application, and communication) including type, version, and service pack or PTF
- sequence of events leading to the problem
- commands and options that you used
- messages received (and the time and date that you received them)
  - product error messages
  - messages from the operating system, such as `file system full`
  - messages from related software

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About This Book

This book contains detailed information about InTune™ and is intended for application and system programmers and administrators responsible for improving or evaluating the efficiency of batch processing programs and online subsystem applications.

This comprehensive manual includes instructions for the installation, customization, and operation of InTune, used to analyze the performance of application programs.

Note

This book assumes that you are familiar with your host operating system.

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How This Book Is Organized

This book is organized as follows. In addition, a glossary of terms and an index appear at the end of the book.

Chapter/Appendix	Description
Chapter 1, “Introduction to InTune”	Introduces you to InTune and describes its features and capabilities.
Chapter 2, “Customizing InTune”	Describes how to set up InTune and run the Installation Verification Procedure (IVP).
Chapter 3, “Centralized Administration of InTune”	Tells you how to set global parameter default values for all InTune users.
Chapter 4, “Working in the InTune Environment”	Explains the InTune ISPF interface and how to use InTune’s features to obtain the best results.
Chapter 5, “Setting Up a Monitor Definition”	Describes how to define the criteria used by InTune for sampling applications.
Chapter 6, “Invoking a Monitor”	Describes how to start a monitor session to collect performance data for an application, including an active job.
Chapter 7, “Analyzing Monitor Data”	Describes all of the online analysis options available with InTune.
Chapter 8, “Working with Interactive Analysis - A Demonstration”	Illustrates how to analyze the data collected during a monitor session using the InTune demonstration program.
Chapter 9, “Using InTune’s Additional Features”	Describes how to analyze monitor data sets created by other users, register program listings, define Csect functions, define Pseudo Groups, and use Content-sensitive Help.
Chapter 10, “InTune Open Application Program Interface”	Tells you how to define and invoke monitors using TSO commands, batch jobs, or from within a program.
Chapter 11, “Generating InTune Batch Reports”	Describes how to define and create InTune batch reports and Microsoft Excel spreadsheets.
Chapter 12, “Using InTune to Tune Your Application”	Describes each delay category and explains the reasons for specific types of program delays.
Chapter 13, “Using InTune in a DB2 Environment”	Contains specific information about using InTune in a DB2 environment.
Chapter 14, “Using InTune in a CICS Environment”	Contains specific information about using InTune in a CICS environment.

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Chapter/Appendix	Description
Chapter 15, “Using InTune in an IMS Environment”	Contains specific information about using InTune in an IMS environment.
Chapter 16, “Using InTune with a Non-IBM Database”	Contains specific information about using InTune with Adabas, Natural, and CA-Datacom applications.
Appendix A, “How InTune Monitors an Application”	Describes the internal operation of InTune.

Related Documentation

When installing and maintaining InTune, refer to the *Product Installation & Maintenance Guide*.

If you are using IBM System Authorization Facility (SAF), you may need to refer to the manual *Implementing Security for MainView Products* for information about how to secure InTune.

Online and Printed Books

The books that accompany BMC Software products are available in online format and printed format. You can view online books with Acrobat Reader from Adobe Systems. The reader is provided at no cost, as explained in “To Access Online Books.” You can also obtain additional printed books from BMC Software, as explained in “To Request Additional Printed Books.”

To Access Online Books

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In some cases, installation of Acrobat Reader and downloading the online books is an optional part of the product-installation process. For information about downloading the free reader from the Web, go to the Adobe Systems site at **http://www.adobe.com**.

To view any online book that BMC Software offers, visit the support page of the BMC Software Web site at **http://www.bmc.com/support.html**. Log on and select a product to access the related documentation. (To log on, first-time users can request a user name and password by registering at the support page or by contacting a BMC Software sales representative.)

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Online Help

You can access Help for a product through the product's main menu. The online Help provides information about the product's user interface and provides instructions for completing tasks.

Release Notes

Printed release notes accompany each BMC Software product. Release notes provide up-to-date information such as

- updates to the installation instructions
- last-minute product information

The latest versions of the release notes are also available on the Web at **http://www.bmc.com/support**.

Conventions

The following conventions are used in this book:

- This book includes special elements called *notes*, *warnings*, *examples*, and *tips*:

Note

Notes provide additional information about the current subject.

Warning

Warnings alert you to situations that can cause problems, such as loss of data, if you do not follow instructions carefully.

Example

An example clarifies a concept discussed in text.

Tip

A tip provides useful information that may improve product performance or make procedures easier to follow.

- `All syntax, operating system terms, and literal examples are presented in this typeface.`

- In instructions, **boldface** type highlights information that you enter. File names, directories, and Web addresses also appear in boldface type.

- The symbol => connects items in a menu sequence. For example, **Actions => Create Test** instructs you to choose the Create Test command from the Actions menu.

- The symbol » denotes one-step instructions.

- In syntax, path names, or system messages, *italic* text represents a variable, as shown in the following examples:

  `The table table_name is not available.`

  system/*instance/file_name*

- In syntax, the following additional conventions apply:

  — A vertical bar (|) separating items indicates that you must choose one item. In the following example, you would choose *a*, *b*, or *c*:

  `a | b | c`

  — An ellipsis (. . .) indicates that you can repeat the preceding item or items as many times as necessary.

  — Square brackets ([ ]) around an item indicate that the item is optional.

Introduction to InTune

This chapter provides an overview of InTune, Version 2, Release 2.00. The following topics are discussed:

What is InTune? 1-2
The InTune Interface 1-3
How InTune Works. 1-4
InTune Basic Tasks. 1-5
Interactive Analysis Options 1-8
Additional InTune Features 1-12

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What is InTune?

InTune is part of the BMC Software MAINVIEW family of performance automation products.

InTune monitors application programs to pinpoint delays. It samples program activity, showing you the application's view of performance. InTune presents detailed application-specific delay information, allowing you to improve the performance of your application.

From a single program monitoring session, InTune can answer questions for the Application Programmer, Systems Programmer, and Database Administrator. This ability saves time and reduces machine resources used in resolving program bottlenecks or delays.

Application Tuning

Application tuning is the process of analyzing and adjusting the performance of an application with the goal of maximizing efficiency and effectiveness. By focusing on the major causes of delay associated with an application, InTune leads you to the best solutions for your worst problems. There are many reasons for tuning your applications:

- To improve the success of a business.
- To meet increasing performance demands.
- To reduce costly, highly-visible delays due to inefficient applications.
- To evaluate applications under development and compare third-party software.
- To identify the source of batch, CICS, DB2, and IMS loops and waits.
- To plan and position for a shrinking batch window.

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This book includes several chapters devoted to aiding the user with specific application tuning issues.

The InTune Interface

InTune uses an easy-to-understand ISPF interface called the InTune TSO Client. The TSO Client consists of a series of panels. Each panel is designed to link to the next logical panel, enabling you to focus on finding straightforward answers to normally elusive performance questions. When InTune is invoked, the first panel you see is the Primary Option Menu (Figure 1-2).

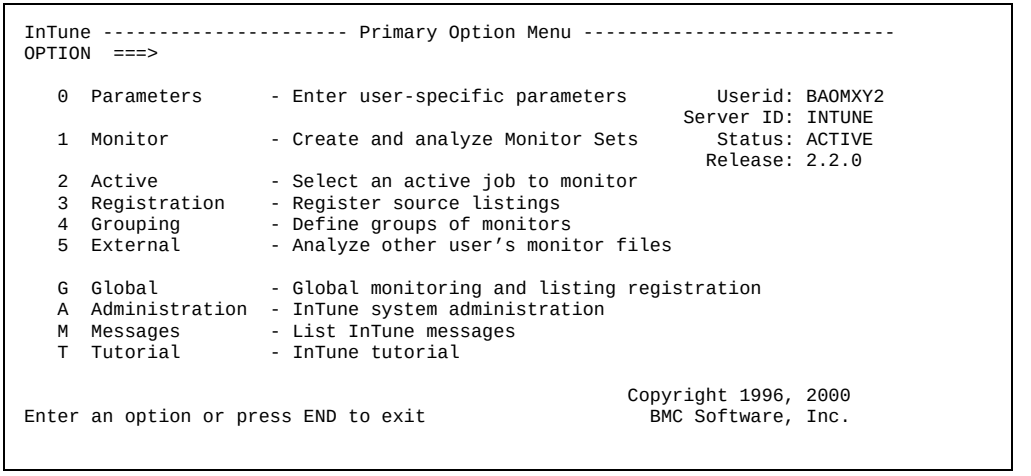
Figure 1-1 Primary Option Menu

```
InTune ---------------------- Primary Option Menu ----------------------------
OPTION  ===>

   0  Parameters      - Enter user-specific parameters        Userid: BAOMXY2
                                                           Server ID: INTUNE
   1  Monitor         - Create and analyze Monitor Sets       Status: ACTIVE
                                                            Release: 2.2.0
   2  Active          - Select an active job to monitor
   3  Registration    - Register source listings
   4  Grouping        - Define groups of monitors
   5  External        - Analyze other user's monitor files

   G  Global          - Global monitoring and listing registration
   A  Administration  - InTune system administration
   M  Messages        - List InTune messages
   T  Tutorial        - InTune tutorial
```

Figure 1-2 Primary Option Menu



Chapter 4, "Working in the InTune Environment" describes the Primary Option Menu in detail, as well as how to use other additional aspects of the InTune interface.

Online Tutorial

InTune contains an online tutorial which guides you through the main features of InTune, including the process of setting up a monitor and analyzing the resulting data to help solve performance problems. BMC Software recommends that you view this tutorial before using InTune for the first time. Select Option T from the Primary Option Menu to begin the tutorial.

How InTune Works

The InTune Server Space, a multi-address space structure, provides for non-invasive sampling in the target application address space. Monitor sessions are defined and analyzed using the TSO Client.

Intune samples the target application using a DIE/SRB routine to determine which program is running for each task, where the program is executing, and if and why it is waiting. These samples are written to a file for later analysis, along with Csect, STEPLIB, LINKLIB, and other information related to the job.

See Appendix A, “How InTune Monitors an Application” for a detailed description of the internal operation of InTune.

InTune Basic Tasks

There are three basic tasks performed when using InTune:

- Creating monitor definitions
- Invoking a monitor
- Analyzing monitor data

Creating Monitor Definitions

A monitor definition is the set of information which InTune uses when sampling an application. A monitor definition is identified by its profile name. You create a monitor definition by specifying a set of monitoring criteria. Monitoring criteria include:

- A description of the monitor
- Whether a batch report is generated
- The job name of the target application
- The system on which the target is running
- The job step, procedure step, and program name to monitor
- The duration, number of samples, start delay, and time range of the monitor

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- The schedule for the monitor
- Multiple monitoring sessions for a single execution of a job step
- The number of times a job step is monitored
- The names of the multiple job steps to be monitored
- Environment-specific information involving CICS, IMS, ADABAS, Natural, and CA-Datacom

Chapter 5, “Setting Up a Monitor Definition” describes in detail how to set up and use monitor definitions.

Invoking a Monitor

When you invoke a monitor definition, you use the specified criteria to start the sampling of the target application. A monitor request is passed to the InTune Server Space. The InTune Server Space manages pending and active monitor sessions. See Appendix A, “How InTune Monitors an Application” for a detailed description of how the InTune Server Space monitors an application.

A monitor can be invoked in one of three ways:

- Invoking a monitor definition for managed or scheduled monitoring.
- Choosing a job which is actively running for immediate results.
- From outside the TSO Client for automated operations.

Chapter 6, “Invoking a Monitor” and Chapter 10, “InTune Open Application Program Interface” describe how to start a monitor session.

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Analyzing Monitor Data

Once sampling has been completed for a monitor definition, the data is stored in a monitor data set pointed to by the User Information File (UIF). The Interactive Analysis Facility formats this data into a set of panels that displays the information in a format that you can use to solve performance problems.

How InTune Reports Results

InTune reports delay information as percentages of the total monitored period. Program activity is divided between active and wait states, where the delay related to a particular module is shown as a percentage of the monitored period when the module was actively using a CPU and when it was waiting for a CPU. The combined percentage is also reported.

Using Autonavigation

The Autonavigation feature allows you to find the information you are looking for quickly and directly. By placing the cursor on an item in a display panel and pressing Enter, the next most logical panel is displayed, based on the selected content. See “Using Autonavigation” on page 4-14 for more information.

Analysis Types

You can choose to display monitor results in one of four ways:

- **Analyze Normal -** Information which is not directly related to the target application is eliminated. Data is reported as follows:

  — Samples related to delay categories such as Waiting for CPU, LPAR delay, and Swap delay are omitted from reports.

  — DelayView, TimeView, DataView, and ModView show all relevant delays for the application. All relevant samples for both Active and Wait are reported.

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— CodeView and related histograms report only active samples, to emphasize the most CPU-intensive portions of the program code. Wait samples, which can mask this activity, are not included.

- **Analyze All -** Percentages are calculated based on all samples. This allows you to compare delays occurring when the program is executing in both active and wait states.

- **Analyze Active -** Percentages are calculated based on samples where the program was actively using CPU. Samples which contain only wait information are filtered out. This allows you to make normalized CPU comparisons of program activity.

- **Analyze Wait -** Percentages are calculated based on samples where the program was in a wait state. Samples which contain only active information are filtered out. This allows you to make normalized comparisons of program wait activity.

For more information about the Interactive Analysis Facility, see Chapter 7, “Analyzing Monitor Data”.

InTune can produce batch reports based on this data. For more information about producing batch reports, see Chapter 11, “Generating InTune Batch Reports”.

Interactive Analysis Options

Once you have specified an analysis option for a monitor definition, InTune loads the data and displays the Interactive Analysis menu (Figure 1-3). Each option on this menu displays the data from a different perspective.

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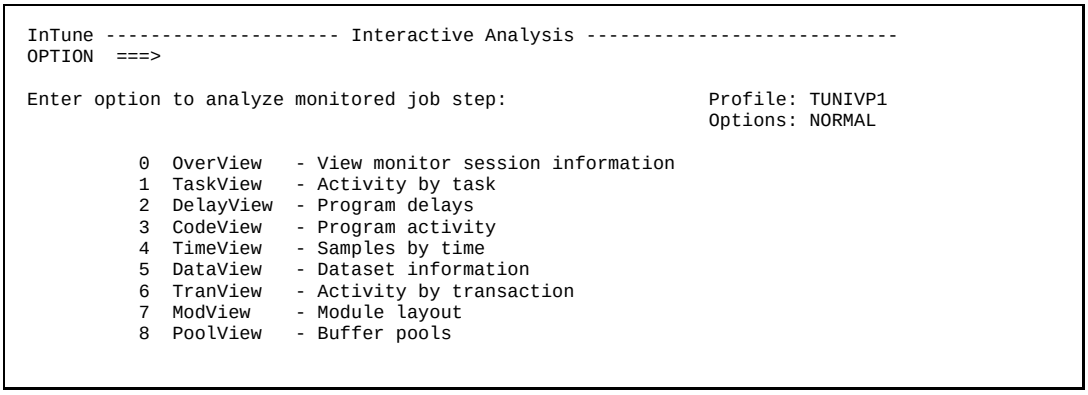
Figure 1-3 Interactive Analysis Menu



OverView

OverView (Option 0) displays information about the monitoring process, as well as key global statistics about the monitored application. These statistics can help you determine the next most logical panel to display as you continue your analysis effort.

TaskView

TaskView (Option 1) displays information about the performance of each OS/390 task in the monitored address space. If you select a task, InTune recomputes the values using only samples from the selected task on all subsequent screens you display. This enables you to focus on the performance of that task.

DelayView

DelayView (Option 2) divides the program into functional delay types. Delay types comprise everything that contributes to the elapsed time of the program, including time that the program was executing. See Chapter 12, “Using InTune to Tune Your Application” for a comprehensive list of delay types identified by DelayView.

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CodeView

CodeView (Option 3) displays the execution and wait time of each module used by the program. You can display this information in greater detail down to the Csect level. You can define Pseudo Groups, which are specific to your environment, to summarize the information for multiple modules. This enables you to identify time consuming areas of code and to associate subroutines within a program and program modules within an application framework.

TimeView

TimeView (Option 4) displays program activity in time sequence. Each row of information represents a single sample taken during the monitored period. This format helps you determine a program's execution path and looping logic. This format also gives a good indication of which code sections executed and when they executed during the monitored period.

DataView

DataView (Option 5) displays data sets, databases, and DB2 statements which caused activity during the monitored period. The data is sorted in descending order by activity. You can select a particular data set, database, or DB2 statement to display greater detail.

TranView

TranView (Option 6) shows IMS or CICS activity in terms of individual transactions. It displays the percentage of time InTune detected activity for each transaction in the six major activity and delay categories. If you select a transaction, InTune recomputes the values on all subsequent screens you display, using only samples from the selected transaction. This enables you to focus on the performance of that transaction.

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ModView

ModView (Option 7) displays the activity of each load module. From ModView, you can hyperlink to module details or to a panel which suggests a linkage order for reducing system paging.

PoolView

PoolView (Option 8) displays statistics on IMS OSAM or VSAM/LSR and VSAM/GSR buffer pool usage. PoolView provides information about hit ratios, size and number of buffers, and total space requested. You can also display information about the data sets attached to a pool.

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Additional InTune Features

InTune has several additional features which can assist you with tuning your applications to get the maximum benefit from InTune. These features include:

- Analyzing Monitor Data Sets Created by Other Users
- Registering Program Listings
- Associating Functional Descriptions of Csects
- Grouping Related Program Modules Using Pseudo Groups
- Adding Content-Sensitive Help
- Using Global Monitors
- Creating Monitor Schedules
- Monitoring Multi-Step Jobs
- InTune System Administration
- Displaying InTune Messages

Analyzing Monitor Data Sets Created by Other Users

You can analyze data from a monitor data set created by someone else by adding it to your list of external monitor data sets. For more information, see “Analyzing Monitor Data Sets Created by Other Users” on page 9-4.

Registering Program Listings

By registering program listings, InTune can relate program activity to actual high-level language statements, instead of to Csect offsets only. You can register program listings in Assembler, COBOL, PL1, FORTRAN, IBM C/C++, and SAS C. Programs must be compiled with specific compiler options before they can be registered.

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You can register a program online with the InTune TSO Client, or offline using the InTune batch registration procedure *hilevel*.TNBATREG. When registering a program online through the TSO Client, you can chose to register the listings locally or globally. A listing that is registered locally is only available to the InTune TSO Client that performed the program registration; a listing that is registered globally is available to all InTune users.

For more information about registering a program listing, see “Registering Source Program Listings” on page 9-34.

Associating Functional Descriptions of Csects

You can define functional descriptions for Csects. These descriptions appear on interactive analysis panels, such as CodeView, DelayView, and ModView. During analysis, you can use these functional descriptions to identify what each Csect does. InTune supplies over 5000 functional descriptions for system routines and COBOL library routines.

For more information about defining Csects, see “Adding Csect Descriptions” on page 9-13.

Grouping Related Program Modules Using Pseudo Groups

By grouping related program modules into pseudo groups, InTune can provide summarized reporting on these modules in the CodeView panel. This allows data representation by functions rather than by module/Csect names alone. InTune supplies many pseudo groups for IBM modules.

For more information about using Pseudo Groups, see “Defining Pseudo Groups” on page 9-16.

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Adding Content-Sensitive Help

To add online help information for specific Csects, pseudo groups, and delay categories, InTune provides help members that you can modify. This help information is accessed by placing the cursor on a highlighted field and pressing PF1 on the DelayView, CodeView, Histogram, or DataView panels.

For more information about adding content-sensitive help, see “Updating Content-Sensitive Help” on page 9-20.

Using Global Monitors

You can also define and start monitor sessions without using the InTune TSO Client. Monitor sessions invoked from outside the InTune TSO Client are called global monitors. Global Monitor Definitions are associated with the InTune Server and not a specific user and are primarily used when the monitor sessions are invoked outside of the InTune TSO Client using InTune’s Open Application Program Interface (Open API). This Open API allows you to monitor an application when conditions are most critical, for example when a critical performance threshold is exceeded.

The information collected when using a global monitor is analyzed and administered using the Global Monitoring Menu option. Because global monitors are not assigned to a specific user, the data is written to the Global Monitors data set.

For more information on using global monitors, see “Creating and Using Global Monitors” on page 9-2.

For more information on the InTune Open API, see Chapter 10, “InTune Open Application Program Interface”.

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Creating Monitor Schedules

You can define when a program is to be monitored by InTune by creating a schedule for the monitor session. While creating a monitor definition, you can specify monitoring by day-of-week, time and date. You can specify scheduling criteria for individual monitor definitions, or select from permanent “shift” definitions defined by the InTune administrator. For example, you might have schedules for weekend processing that can be reused every weekend.

For more information on creating schedules, see “Creating a Monitor Schedule” on page 5-28.

Monitoring a Multi-Step Job

If you would like to create monitors for an entire region and not just for specific job steps, you can create a group of monitor definitions (or profiles) that are activated by a trigger monitor. This ensures that you have the necessary data for analysis of all jobsteps in a multi-step process.

For more information on grouping monitor definitions, see “Creating a Multi-Job Monitor: Grouping” on page 5-25.

InTune System Administration

InTune is typically used by a group of users. To facilitate consistency, the Administration option allows view System and User default parameters. These are the default parameters which are specified for all users in a group. For more information on System and User default parameters, see “Setting Global System and User Default Values” on page 3-2.

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Displaying InTune Messages

The Messages option shows all of the messages which can be issued by the InTune Server Space during routine operation. You can select a message to display further detail. See “Message Help” on page 4-8.

InTune Tutorial

If you are new to InTune, you should go through the online tutorial provided with InTune. This will acquaint you with the features and operation of InTune and illustrates an example application.

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Customizing InTune

This chapter describes the steps required to install, customize, and verify the operation of InTune at your site. This chapter describes the following steps:

Overview of the Installation and Customization Process 2-2
Specifications 2-3
Migration Considerations 2-4
Installing InTune 2-6
Customizing InTune 2-6
Completing the Customization Worksheet 2-30
Post-Customization Instructions 2-32
Verifying the Installation and Operation of InTune 2-56

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Overview of the Installation and Customization Process

The following list provides an overview of the steps required to setup and implement InTune at your site:

- Review the information in the sections “Implementing SAF Security for InTune” on page 2-33 and “Providing InTune with Access to System and Application Resources” on page 2-39. It is important to understand how the various security and access considerations for InTune before proceeding with Installation and Customization.

- Perform the steps described in the Product Installation and Maintenance Guide TD-2024 to download the product from the distribution tape.

- Customize InTune by defining product libraries, creating product JCL and EXECs and defining other installation-specific criteria. You can customize InTune either using the AutoCustomization facility described in Chapter 5 of the Product Installation and Maintenance Guide or by following the steps described in “Customizing InTune Manually” on page 2-7.

- Implement SAF security, as described in “Implementing SAF Security for InTune” on page 2-33.

- Enable InTune by ensuring access to system and application resources, as described in “Providing InTune with Access to System and Application Resources” on page 2-39.

- Start the InTune Server space.

- Verify the installation and operation of InTune by starting the InTune Server Space and creating, invoking, and analyzing a monitor definition.

The following sections provide the detail for these steps.

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Specifications

This section contains a list of all the prerequisite hardware, software, and other additional information you will need to know regarding what is required and supported to run InTune version 2.2.00.

Hardware Requirements

InTune 2.2.0 executes on all processors capable of running support versions of MVS/ESA and OS/390.

Software Requirements

MVS/ESA 5.2 or above, or OS/390, all versions through 2.9
ISPF/PDF 4.1 and above
TSO/E V2.3.1 and above

Subsystems and Languages Supported

DB2 3.1, 4.1, 5.1, 61
IMS 3.1, 4.1, 5.1, 6.1, 7.1
CICS 2.12 and above
CTS 1.1, 1.2, 1.3
Adabas 4.6, 5.3, 6.1, 6.2
Natural 2.1, 2.2, 2.3, 3.1
CA-Datacom 8.1, 9.0
CA-Optimizer
COBOL VS, COBOL II, COBOL for MVS & VM
FORTRAN
PL/I
IBM C/C++
SAS/C
Assembler

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Listing Managers Supported

PDS
Compuware DDIO
CA-Panvalet
CA-Librarian

Migration Considerations

If you are migrating from an earlier release of InTune, you are still able to use all of your existing monitor definitions in the same way. This section describes the things you need to keep in mind when migrating from an earlier release of InTune.

Considerations for the User Information File

The internal tables in which InTune stores monitor definitions have been changed. When you use InTune for the first time, you are alerted to the changes by the User Information File Allocation panel (Figure 4-1 on page 4-3). This panel enables you to automatically copy your existing monitor definitions from your current tables data set to the new User Information File. This panel is not displayed if the system default DISPLAY_ALLOC_PANEL = NO is specified in the Global Tables Data Set (using *hilevel*.BBPARM member TUNSDEFS). The User Information File is allocated using the default values. Refer to “System Default Settings” on page 3-4 for more information. Specify YES in the field that asks if you want InTune to allocate a new data set.

If you have used InTune 1.3 (or 2.1), you already have a similar type of data set allocated, but this must be reallocated in the new format. This data set contains all the information about your monitor definitions.

If you want to migrate this information to the new data set, specify YES where indicated. If you want to allocate the data set without migrating the information, specify NO.

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The following message tells you the latest level of maintenance:

Table maintenance update in progress (BPM*xxxx*)

where *xxxx* indicates the PTF level of your User Information File.

Note

InTune issues enqueues that are SYSTEMS wide (GRS), with the major names of INTUNE and DAMTBSVS. To preserve the integrity of the User Information File and the Global Information File, these enqueues must be honored and cannot be converted to SYSTEM wide.

Considerations for the Global Information File

To migrate the entries in the InTune 1.3 or 2.1 Global Information File (GIF) to the new release of InTune, complete the following steps:

1. Follow steps 1 through 7 as described in “Task 5 - Create the InTune Global Information File” on page 2-14.

2. Insert an IDCAMS REPRO statement after the DEFINE CLUSTER command in the TUNVSAM job step.

3. Submit the JCL.

Installing InTune

Complete instructions for installing InTune are included in the *Product Installation and Maintenance Guide*.

Note

InTune issues enqueues that are SYSTEMS wide (GRS), with the major names of INTUNE and DAMTBSVS. To preserve the integrity of the User Information File and the Global Information File, these enqueues must be honored and cannot be converted to SYSTEM wide.

Note

Each TSO user requires a region of at least 4 MB specified in the EXEC statement of the TSO logon procedure.

Customizing InTune

You can customize InTune either by using the AutoCustomization facility or manually. BMC Software recommends using the AutoCustomization facility.

Using AutoCustomization

AutoCustomization is an online facility for customizing BMC Software products. An ISPF interface presents customization steps in sequence and provides status updates during installation.

A Customization Worksheet is provided on page 30 to aid with customization. It includes space to record all of the information necessary to set up and run InTune 2.2 and this worksheet can be used later as reference.

When customization is complete, skip to “Post-Customization Instructions” on page 2-32.

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Customizing InTune Manually

If you choose to customize InTune manually, complete the following tasks:

1. Add the BMC Software load library to your system APF list.
2. Specify password and server space parameters.
3. Create the SBBHELP data set for user-generated help information.
4. Create the InTune batch report procedure.
5. Create the InTune global information file.
6. Update user and system default values.
7. Create the REXX startup EXECs for invoking the InTune TSO client.
8. Create DB2 definitions.
9. Define CICS support.
10. Assemble and link user exits for Adabas, Datacom, or Natural.
11. Create the InTune Server space JCL procedure.

Task 1 - Add the BMC Software Load Library to Your System APF List

The BMC Software load library, *hilevel*.BBLINK, contains programs that must be APF-authorized. You can authorize BBLINK by adding it to the APF list. By authorizing BBLINK, you grant authority to the InTune Server Space to read load module and Csect information from the appropriate link libraries. You do not grant authority to the TSO user.

Note

If you have other BMC Software products installed and have added BBLINK to your APF list, you may omit this step.

To APF-authorize BBLINK:

1. Add the following line to the dynamic APF list of the SYS1.PARMLIB(PROGxx) member:

   APF ADD DSNAME(*hilvl*.BBLINK) VOLUME(*volume*)

   with

   hilvl - The high-level data set qualifier for BMC Software product data sets that is used throughout installation.

   volume - The volume serial identification where BBLINK resides.

2. Add BBLINK dynamically to your APF list.

Note

If you do not have a facility to add BBLINK dynamically, you must wait until the next IPL before starting InTune.

Task 2 - Specify Password and Server Space Parameters

1. Create a *hilevel*.UBBPARM data set with the following characteristics:

   Organization - PO

   Record format - FB

   Record length - 80

2. Copy *hilevel*.BBPARM member TUNSSP00 to *hilevel*.UBBPARM.

3. Edit member TUNSSP00 as described in Table .

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Table 2-1 TUNSP00 Parameters

Parameter	Description
General Parameters	
KEY	Type the authorization key to run InTune. If you are using more than one key, specify each key with a “KEY=” identifier. Refer to the document entitled “MAINVIEW Password Cover Letter”, that was shipped with the product.
SERVERID	Specify the one-to-eight character InTune Server Space name to identify the Server Space currently running in the system. The default is INTUNE. You can use one of the following variables: **&JOBNAME** substitutes the address space name of the InTune Server Started Task. **&SYSNAME** substitutes the OS/390 SYSNAME assigned to the local OS/390 system.
MAXREQ	Specify the maximum number of monitor requests that can be concurrently queued to the InTune Server Space. The default value is 3.
CAPS	Specify whether the InTune Server Space should issue WTO (write-to-operator) messages in mixed case (OFF) or translate all WTO message to uppercase (ON). The default is OFF. Specify ON if the InTune Server Space WTO messages are displayed on a Katakana terminal.
QTLIMIT (Optional)	Specify the Queue Time Limit in hours for monitor requests. This is the length of time InTune will wait for a job to start before cancelling the request. The value must be between 1 and 9999 hours. The default is 168 hours. The QTLIMIT includes weekends and holidays. There are 8760 hours in a year and 8784 hours in a leap year.
DSNPREFX (Optional)	Specify the one-to- eight character prefix to use when allocating InTune monitor data sets. If specified, this prefix is appended as the first node of the data set name for all user monitor data sets allocated by InTune. For more information, see “Implementing SAF Security for InTune” on page 2-33.
CICSNAME (Optional)	Specify the one-to-eight character program name to be used by InTune to determine if an address space is to be sensitized for CICS processing. This is required only if CICS programs have been modified to use a name other than the IBM-supplied default name specified on the // EXEC PGM= JCL statement.
IMSNAME (Optional)	Specify the one-to- eight character program name to be used by InTune to determine if an address space is to be sensitized for IMS processing. This is required only if IMS programs have been modified to use a name other than the IBM-supplied default name specified on the // EXEC PGM= JCL statement.

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Table 2-1 TUNSP00 Parameters

Parameter	Description
Sysplex Parameters	
SYSPLEX	Specify YES to enable XCF sysplex support for the server. Specify NO to run the server in “stand-alone” mode with no XCF support.
GRPNAME (Optional)	Specify the one-to- eight character XCF Group Name used by InTune. The name must start with an alphabetical character between 'J' and 'Z'. The default is ZBABTUN.
MEMNAME (Optional)	Specify the 1-16 character XCF Member Name for the InTune Server Space. You can use the following variables: **&JOBNAME** substitutes the address space (job) name of the InTune Server Started Task. **&SYSNAME** substitutes the OS/390 SYSNAME assigned to the local OS/390 system. If not specified, the default value used will be &SYSNAME, allowing only a single InTune Server Space per OS/390 image in the InTune XCF group.
Security Parameters	
SECURITY	Specify the level of security: NONE No security is used on the local system. Security information is passed to remote systems. LOCAL Security information is checked for local resources by local users only. Requests from remote systems are not checked. REMOTE Security information is checked for remote users only. Local users are not checked. BOTH Access to resources is checked for both local and remote users.
SECCLASS	Specify the General Resource Class Name. The default is FACILITY.
SECPREFX	Specify the first node of the resource name. This will differentiate InTune resource names from other resources within the specified security class. The default is BBINTUNE.
SECDUSER	Specify the default user name to be used if a remote user is not found on the local system.
SECDGRP	Specify the default group name to be used if a remote user is not found on the local system.

Example Parameter Settings

Table 2-2 TUNSP00 Parameters

MAXREQ=7	Maximum number of requests is seven
DSNPREFX=TUN21	'TUN21' is appended to monitor data sets
KEY=TUN-****-**-*****-12345-67CF	Password from product documentation
QTLIMIT=48	Monitor requests cancelled after 2 days
SERVERID=TUNPROD	Server name is TUNPROD
MEMNAME=&SYSNAME&JOBNAME	XCF member name uses system and job names
GRPNAME=TUN21TAT	XCF group name is TUN21TAT
SYSPLEX=YES	InTune to be used in a Sysplex
SECDUSER=ABCDEF1	Default user ID is ABCDEF1
SECURITY=BOTH	Security checked for LOCAL and REMOTE
SECCLASS=FACILITY	Security class is FACILITY
SECPREFX=BBTUNE	BBTUNE appended to resource definitions

Task 3 - Create the SBBHELP Data Set for User-generated Help Information

In this step, you will create a site-wide data set used for storing content-sensitive help. Refer to "Updating Content-Sensitive Help" on page 9-20 for more information.

1. Create a data set with the following characteristics:

   Organization - PO

   Record format - FB

   Record length - 80

2. Name the data set *hilevel*.SBBHELP, where *hilevel* is the high-level qualifier used for your InTune product library.

Task 4 - Create the InTune Batch Report Procedure

In this step, you will create the JCL used by InTune for generating batch reports.

1. Copy *hilevel*.BBSAMP member TUNBATCH (Figure 2-1) to SYS1.PROCLIB or another system procedure library.

2. Change ?INTUNE to the *hilevel* dataset names used for InTune.

3. Change ?ISPF to the *hilevel* dataset names for ISPF.

4. For the SYSPROC concatenation highlighted in Figure 2-1 on page 2-13, do one of the following:

   Compiled REXX: Select DSN=?INTUNE.BBPROC by commenting DSN=?INTUNE.BBSAMP with an *. This is the default.

   Interpreted REXX: If you are using the IBM alternate library for REXX support and can not run compiled REXX, select DSN=?INTUNE.BBSAMP by commenting DSN=?INTUNE.BBPROC with an *.

Note

The name of the member must be TUNBATCH. If you have several versions of InTune installed, you can use the JCLLIB JCL statement to direct OS/390 to the library where TUNBATCH is located. The JCLLIB JCL statement comes directly after the JOB JCL statement and can be specified as part of the monitor definition job card.

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Figure 2-1 BBSAMP Member TUNBATCH

```
//*-------------------------------------------------------------------*
//*   INTUNE PROCEDURE FOR BATCH REPORTS
//*
//*   INSTRUCTIONS
//*
//*   NOTE: IT IS HIGHLY SUGGESTED THAT YOU CUSTOM TAILOR THIS
//*   PROCEDURE USING THE AUTOCUSTOMIZATION PROCESS !
//*
//*   THIS PROCEDURE ASSUMES THAT YOU ARE RUNNING ISPF V4.X
//*   IF YOU ARE RUNNING V3.X YOU NEED TO MANUALLY CORRECT THE
//*   ISPF LIBRARY NAMES OR USE AUTOCUSTOMIZATION.
//*
//*
//*   START OF MODIFY INSTRUCTIONS
//*      YOU MUST UPDATE THE PROCEDURE AND PLACE IT IN A LIBRARY
//*      THAT IS ACCESSABLE TO JES READERS
//*
//*   TO UPDATE PLEASE DO THE FOLLOWING
//*
//*   1. CHANGE ?INTUNE  TO THE HILEVEL DATASET NAMES USED FOR INTUNE
//*   2. CHANGE ?ISPF  TO THE HILEVEL DATASET NAMES FOR ISPF
//*
//*   NOTE:  IF YOUR INSTALLATION RUNS COMPILED REXX, DO NOT COMPLETE
//*          STEP 3.
//*
//*          IF YOUR INSTALLATION CAN NOT RUN COMPILED REXX, THEN
//*          YOU ARE USING THE IBM ALTERNATE LIBRARY FOR REXX SUPPORT
//*          AND MUST COMPLETE STEP 3.
//*
//*   3. CHANGE THE COMMENT ON THE SYSPROC CONCATENATION SO THAT
//*      ?INTUNE.BBSAMP IS UNCOMMENTED AND ?INTUNE.BBPROC IS
//*      COMMENTED.
//*
//*   END OF INSTRUCTIONS
//*-------------------------------------------------------------------*
//TUNBATCH PROC
//IKJPROC EXEC PGM=IKJEFT01,REGION=4096K,DYNAMNBR=388
//SYSPROC  DD DISP=SHR,DSN=?INTUNE.BBCLIB                  <====
//         DD DISP=SHR,DSN=?INTUNE.UBBSAMP
//*        DD DISP=SHR,DSN=?INTUNE.BBSAMP        <== INTERPRETED REXX
//         DD DISP=SHR,DSN=?INTUNE.BBPROC        <== COMPILED REXX
//ISPPLIB  DD DISP=SHR,DSN=?ISPF.SISPPENU                  <====
//ISPMLIB  DD DISP=SHR,DSN=?ISPF.SISPMENU                  <====
//ISPSLIB  DD DISP=SHR,DSN=?ISPF.SISPSENU                  <====
//ISPTLIB  DD DISP=SHR,DSN=?ISPF.SISPTENU                  <====
//ISPLOG   DD DCB=(RECFM=VA,LRECL=125,BLKSIZE=129),SYSOUT=*
//ISPLST   DD DCB=(RECFM=VA,LRECL=125,BLKSIZE=129),SYSOUT=*
//ISPPROF  DD DSN=&&TEMP,DISP=(NEW,DELETE,DELETE),UNIT=SYSDA,
// SPACE=(CYL,(1,1,5)),DCB=(RECFM=FB,BLKSIZE=6160,LRECL=80)
//SYSTSPRT DD SYSOUT=*
```

Task 5 - Create the InTune Global Information File

InTune uses both User and Global Information files for storing information.

- The User Information File (UIF) stores user-specific information such as monitor definitions. A User Information File is created for a particular user the first time that user executes InTune. No additional customization steps are required.

- The Global Information File (GIF) stores site-wide information, such as user-written online help. The Global Information File must be created during customization and is initialized by the first user who executes InTune after all customization steps are complete.

To create the GIF:

1. Copy *hilevel*.BBSAMP member TUNAVSAM (Figure 2-2) to your JCL library.

2. Add a valid jobcard.

3. Change ?BBDSN to be the name of your VSAM Global Information File.

4. Change ?CYL to the number of cylinders of primary space you wish to allocate. The default is 20.

Note

If you plan to store listings in the GIF from batch registrations, increase the size of the GIF.

5. Change ?SEC to the number of cylinders of secondary space you wish to allocate. The default is 20.

6. Change ?BBVOL to the volser of the volume on which you wish to allocate the data set.

7. Change ?BBCHILV to the high-level qualifier used for your InTune product library.

Note

If you have a GIF from a previous release, uncomment the REPRO statement and specify the name of the GIF in the ?BBODSN field.

8. Submit the JCL.

Note

If you are submitting this for the first time, a return code of 8 from the DELETE statement is normal.

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Figure 2-2 JCL for Allocating the Global Information File (Part 1)

```
//JOBCARD JOB
//*
//*-------------------------------------------------------------------
//*
//*       ** ALLOCATE INTUNE GLOBAL INFORMATION FILE **
//*
//*
//* INSTRUCTIONS:
//*
//* - REVIEW THE JCL FOR APPLICABILITY TO YOUR INSTALLATION
//*   STANDARDS.
//*
//*     - CHANGE ?BBDSN TO BE THE NAME OF YOUR
//*       VSAM GLOBAL INFORMATION FILE.
//*
//*     - CHANGE ?CYL TO THE NUMBER OF CYLINDERS OF PRIMARY SPACE
//*       YOU WISH TO ALLOCATE.
//*
//*     - CHANGE ?SEC TO THE NUMBER OF CYLINDERS OF SECONDARY SPACE
//*       YOU WISH TO ALLOCATE.
//*
//*     - CHANGE ?BBVOL TO THE VOLSER OF THE VOLUME YOU WISH TO
//*       ALLOCATE THE DATA SET ON.
//*
//*     - CHANGE ?BBCHILV TO THE BOOLE & BABBAGE
//*       TARGET LIBRARY PREFIX.
//*
//* END OF INSTRUCTIONS.
//*
//*-------------------------------------------------------------------
//*
//*-------------------------------------------------------------*
//* INLINE PROCEDURE TO CREATE SYSTEM AND USER DEFAULTS.        *
//*-------------------------------------------------------------*
//TUNDEFS  PROC ACTION=LIST,DEFAULTS=SYSTEM
//TUNXDEF  EXEC PGM=IKJEFT01,
//         PARM='%TUNC9000 &ACTION &DEFAULTS'
//*
//STEPLIB  DD   DISP=SHR,DSN=?BBCHILV.BBLINK
//TUNLLIB  DD   DISP=SHR,DSN=?BBCHILV.BBLINK
//SYSEXEC  DD   DISP=SHR,DSN=?BBCHILV.BBSAMP
//SYSTSIN  DD   DUMMY
//SYSTSPRT DD   SYSOUT=*
// PEND
//*
//*-------------------------------------------------------------*
//* DEFINE AND ALLOCATE GLOBAL INFORMATION FILE.                *
//*-------------------------------------------------------------*
//TUNVSAM  EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
 DELETE ?BBDSN
 IF LASTCC = 8 THEN DO
    SET LASTCC = 0
    SET MAXCC = 0
 END
 DEFINE CLUSTER ( NAME(?BBDSN) -
                  CYL(?CYL ?SEC) VOL(?BBVOL) -
                  LINEAR SHR(2,3) ) -
        DATA    (NAME(?BBDSN.DATA))
/*
```

Figure 2-3 JCL for Allocating the Global Information File (Part 2)

```
//*-------------------------------------------------------------*
//* INITIALIZE THE GLOBAL INFORMATION FILE.                     *
//*-------------------------------------------------------------*
//TUNIGIF1 EXEC PGM=IKJEFT01
//STEPLIB  DD   DISP=SHR,DSN=?BBCHILV.BBLINK
//TUNLLIB  DD   DISP=SHR,DSN=?BBCHILV.BBLINK
//SYSEXEC  DD   DISP=SHR,DSN=?BBCHILV.BBSAMP
//*
//SYSTSIN  DD   *
 PROFILE NOPREFIX
 %TUNC5050 ?BBCHILV.BBSAMP
 %TUNC9300
/*
//SYSTSPRT DD   SYSOUT=*
//*
//TUNDB    DD   DISP=SHR,DSN=?BBDSN
//*
//*-------------------------------------------------------------*
//* INITIALIZE THE SYSTEM AND USER DEFAULTS.                    *
//*-------------------------------------------------------------*
//TUNSDEFS EXEC TUNDEFS,
//         ACTION=UPDATE,
//         DEFAULTS=SYSTEM
//*
//SYSIN    DD   DISP=SHR,DSN=?BBCHILV.BBPARM(TUNSDEFS)
//TUNDB    DD   DISP=SHR,DSN=?BBDSN
//*
//TUNUDEFS EXEC TUNDEFS,
//         ACTION=UPDATE,
//         DEFAULTS=USER
//*
//SYSIN    DD   DISP=SHR,DSN=?BBCHILV.BBPARM(TUNUDEFS)
//TUNDB    DD   DISP=SHR,DSN=?BBDSN
```

Task 6 - Update User and System Default Values

You may use this step to define the User and System default values stored in the Global Information File. If you wish to use the values provided by InTune, you may skip this step. See “Setting Global System and User Default Values” on page 3-2 for complete information.

Task 7 - Create the REXX Startup EXECs for Invoking the InTune TSO Client

In this step, you will create the REXX startup EXECs which invoke InTune.

Creating the InTune TSO REXX EXEC:

Used to invoke InTune from TSO/ISPF.

1. Copy *hilevel*.BBSAMP member TNISPF1 (Figure 2-4) to *hilevel*.BBCLIB or another SYSPROC library of your choice.

2. Change the name of member TNISPF1 to INTUNE or some other site preference. This is the name of the EXEC that you will use to invoke InTune from ISPF.

3. Change the '?SYSPRFX' to the hilevel qualifier you chose for the product libraries.

Figure 2-4 InTune Start-up EXEC TNISPF1

```
/* REXX * InTune Start-up Exec ************************************/

PARSE ARG PLIST
ADDRESS TSO "EX '?SYSPRFX.BBCLIB(BACTUN)' '"PLIST"'"
EXIT RC

/*********************************************************************/
/*                                                                   */
/* The purpose of this exec is to invoke InTune outside of the       */
/* MainView Common Menu.  During AutoCustomization, this InTune      */
/* startup exec is created and saved in a library of your choice.    */
/*                                                                   */
/* The source member for this exec is TNISPF1.  It is located in   */
/* the hilevel.BBSAMP library.                                       */
/*                                                                   */
/* During AutoCustomization another startup exec, BACTUN, is         */
/* created and saved in hilevel.BBCLIB.  BACTUN is a required name. */
/* It is called for both online and batch processing.  The BACTUN    */
/* exec must reside in the hilevel.BBCLIB library.                   */
/*                                                                   */
/* The source member for the BACTUN exec is TNISPF.  It is located */
/* in the hilevel.BBSAMP library.  If you wish to edit the BACTUN    */
/* exec please read the instructions carefully in the BACTUN source */
/* member, TNISPF.                                                  */
/*                                                                   */
/*********************************************************************/
```

Creating the InTune Batch REXX EXEC:

Used for online and batch processing.

1. Copy *hilevel*.BBSAMP member TNISPF (Figure 2-5) to *hilevel*.BBCLIB.

2. Rename TNISPF to BACTUN and open in EDIT mode. BACTUN must reside in *hilevel*.BBCLIB to invoke InTune in batch and ISPF.

3. Change ‘?SYSPRFX’ to the hilevel qualifier you chose for the product libraries.

4. Change ‘?REXXLIB’ to either BBPROC to execute InTune in its compiled form or BBSAMP to execute InTune using the interpreted version.

5. Change ‘?TUNGTDS’ to the data set name you used for your Global Information File.

Figure 2-5 Data Set Specifications in TNISPF

```
TUNDB   = "'?TUNGTDS'"

TUNEXEC = "'?SYSPRFX.?REXXLIB'",
          "'?SYSPRFX.BBCLIB'"

TUNHELP = "'?SYSPRFX.SBBHELP' ",
          "'?SYSPRFX.BBHELP' "

TUNPLIB = "'?SYSPRFX.BBPLIB'"
TUNMLIB = "'?SYSPRFX.BBMLIB'"
TUNTLIB = "'?SYSPRFX.BBTLIB'"
TUNSAMP = "'?SYSPRFX.BBSAMP'"

TUNLLIB = "'?SYSPRFX.BBLINK'"
```

Task 8 - Create DB2 Definitions

If you are using InTune in a DB2 environment, you must specify DB2 system information, bind the TNDB2 plan, and grant authority to PUBLIC. This will allow InTune to display SQL and Plan information. If this step is not performed, InTUne will still gather data, but will not gather DB2-related data.

Note

You must be a DBA or have full DB2 authorization to perform this step. DB2 must be active when you perform this step. You must perform this step on the system where InTune will run. Proper authority is required to submit jobs.

1. Copy *hilevel*.BBPARM member TUNDB200 to *hilevel*.UBBPARM. Open TUNDB200 in Edit mode.

2. Specify the data set name for the load library containing DB2 load modules for the appropriate release version.

3. Copy *hilevel*.BBSAMP members TNTIAD, TNAUTHJ, TNBINDJ, TNBIND1, and TNBIND2 to the *hilevel*.UBBSAMP library.

4. Open TNTIAD (Figure 2-6) in EDIT mode. Specify the following:

   - DB2 subsystem identifier in SYSTEM field; for example, DB2A.
   - DB2 release version in PLAN field; for example, DSNTIA41 for version 4.1.
   - DB2 load library in LIB field; for example, 'DSN410.RUNLIB.LOAD'.

Figure 2-6 BBSAMP Member TNTIAD

```
DSN SYSTEM(DB2A)
RUN PROGRAM(DSNTIAD) PLAN(DSNTIA41) -
    LIB('DSN410.RUNLIB.LOAD') -
    PARM('RC0')
END
```

5. Open TNBIND1 (Figure 2-7) in EDIT mode. Specify the DB2 subsystem identifier in the SYSTEM field; for example, DB2A.

Figure 2-7 BBSAMP Member TNBIND1

```
DSN   SYSTEM(DB2A)
BIND  PACKAGE(TUN21) -
      MEMBER(TNMADB2M) -
      ACTION(REP) ISOLATION(CS) -
      RELEASE(COMMIT) -
      DEGREE(ANY) ENABLE(*)
END
```

6. Repeat Step 5 for TNBIND2 (Figure 2-8).

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Figure 2-8 BBSAMP Member TNBIND2

```
DSN   SYSTEM(DB2A)
BIND  PLAN(TNDB2)  -
      PKLIST(*.TUN21.*)  -
      ACTION(REP) ISOLATION(CS) -
      ACQUIRE(USE) RELEASE(COMMIT)
END
```

7. Open TNBINDJ in EDIT mode. Follow the instructions in the header to submit the JCL.

8. Open TNAUTHJ in EDIT mode. Follow the instructions in the header to submit the JCL.

Task 9 - Define CICS Support

InTune supplements its CICS support by providing additional information for the types of delays that are specific to a CICS environment. This feature is available for CICS Release 4.1, and CICS Transaction Server Releases 1.1, 1.2, and 1.3.

To enable this additional subsystem support, complete the following steps:

- Modify the CICS JCL to add BBLINK to the DFHRPL concatenation

- Install the Resource Definition Online (RDO) definitions for the transactions and programs required to support this new feature

- Modify the Program Load Table (PLT) and the System Initialization Table (SIT) to load the InTune exit programs when CICS initializes

These steps are described in detail in the following sections.

Modify the CICS JCL to Add BBLINK to DFHRPL

The BBLINK data set must be identified to CICS to allow CICS to load the InTune exit programs when CICS initializes. Complete the following steps:

1. Add the following DD statement to the DFHRPL library concatenation in the CICS execution step

```
//    DD DSN=prefix.BBLINK,DISP=SHR
```

   where *prefix* is the dataset high-level qualifier specified at InTune installation.

2. Repeat step 1 for each CICS region that you will monitor using InTune.

Define Transactions and Programs to CICS

Run the following job to install the definitions for the InTune transactions and programs that are necessary to collect the CICS delay information. This job is used as input to the Resource Definition Online (RDO) function in the CEDA transaction. It defines all required programs and transactions to CICS by modifying the Program Control Table and Program Properties Table.

To customize the job to meet the needs of your installation, see the instructions in the BBSAMP member TNCSDUP$ (shown in figure Figure 2-9) for more information. Note that there is a separate BBSAMP TNCSDC*nn* member for each CICS release, where *nn* is the CICS release number. Figure 2-10 on page 2-24 shows the member for CICS release 5.1. These members contain the RDO definitions needed to complete this step. Specify the TNCSDC*nn* member appropriate to the CICS release(s) you are using.

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Figure 2-9 JCL to Add InTune Definitions

```
//TNCSDUP JOB (ACCT),PGMRNAME
//*
//*
//*-------------------------------------------------------------*
//*     ADD DEFININITIONS TO THE CICS CSD FOR INTUNE            *
//*                                                             *
//*     INSTRUCTIONS:                                           *
//*                                                             *
//*     - COPY THIS MEMBER TO UBBSAMP AND ENTER EDIT            *
//*       FROM THERE.                                           *
//*                                                             *
//*     - CHANGE ?HILEVEL TO THE HIGH-LEVEL QUALIFIER OF        *
//*       THE INTUNE DISTRIBUTION LIBRARIES.                    *
//*                                                             *
//*     - CHANGE ?TUNCICSL TO THE NAME OF THE CICS LOAD         *
//*       LIBARY.                                               *
//*                                                             *
//*     - CHANGE ?TUNCSD TO THE NAME OF THE CICS CSD FILE       *
//*                                                             *
//*     - CHANGE ?TUNCICSR TO THE 2 DIGIT RELEASE OF CICS       *
//*       41 = CICS41, 51 = CTS12, 52 = CTS12, 53 = CTS13       *
//*                                                             *
//*     END OF INSTRUCTIONS.                                    *
//*************************************************************
//LOADCSD EXEC PGM=DFHCSDUP,REGION=2000K
//STEPLIB  DD  DSN=?TUNCICSL,DISP=SHR    <-- CICS LOAD
//DFHCSD   DD  DSN=?TUNCSD,DISP=SHR      <-- CICS CSD NAME
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  DSN=?HILVL.BBSAMP(TNCSDC?CICSREL),DISP=SHR
```

Figure 2-10 Sample TNCSDC*nn* Member

```
*********************************************************************
*                                                                   *
*                    SAMPLE NAME: TNCSDC51                          *
*                                                                   *
*  CICS/ESA RELEASE(S) SUPPORTED: 5.1.0                             *
*                                                                   *
*             PRODUCT(S) DEFINED: INTUNE                            *
*                                                                   *
*  THIS SAMPLE IS INTENDED AS INPUT TO THE TNCSDUP$ RESOURCE        *
*  DEFINITION ONLINE (RDO) JOB.  WHEN USED AS SUCH, IT DEFINES      *
*  ALL REQUIRED PROGRAM AND TRANSACTIONS TO CICS                    *
*  USING GROUP BMCINTUN FOR PROGRAMS, AND BMCINTUN FOR TRANSACTIONS.  *
*                                                                   *
*********************************************************************
*
*      P C T    E N T R I E S
*
DEFINE TRANSACTION(TUNS)   GROUP(BMCINTUN)   TASKDATAKEY(CICS)
       PROGRAM(TC00CTUN)   PRIORITY(1)       ISOLATE(NO)
*
*      P P T   E N T R I E S
*
DEFINE PROGRAM(TC00CMPX)   GROUP(BMCINTUN)    EXECKEY(CICS)
       LANGUAGE(ASSEMBLER) RELOAD(NO)         RESIDENT(YES)
       USAGE(NORMAL)       USELPACOPY(NO)
       STATUS(ENABLED)     CEDF(NO)
       DESCRIPTION(INTUNE CMP GLOBAL USER EXIT)
*
DEFINE PROGRAM(TC00CTUN)   GROUP(BMCINTUN)    EXECKEY(CICS)
       LANGUAGE(ASSEMBLER) RELOAD(NO)         RESIDENT(YES)
       USAGE(NORMAL)       USELPACOPY(NO)
       STATUS(ENABLED)     CEDF(YES)
       DESCRIPTION(INTUNE TRANSACTION PROGRAM)
*
DEFINE PROGRAM(TC00CPLT)   GROUP(BMCINTUN)    EXECKEY(CICS)
       LANGUAGE(ASSEMBLER) RELOAD(NO)         RESIDENT(YES)
       USAGE(NORMAL)       USELPACOPY(NO)
       STATUS(ENABLED)     CEDF(NO)
       DESCRIPTION(INTUNE CICS PLT EXIT)
*
DEFINE PROGRAM(TC00FSET)   GROUP(BMCINTUN)    EXECKEY(CICS)
       LANGUAGE(ASSEMBLER) RELOAD(NO)         RESIDENT(YES)
       USAGE(NORMAL)       USELPACOPY(NO)
       STATUS(ENABLED)     CEDF(YES)
       DESCRIPTION(INTUNE START/STOP ROUTINE)
*
DEFINE PROGRAM(TC00FVER)   GROUP(BMCINTUN)    EXECKEY(CICS)
       LANGUAGE(ASSEMBLER) RELOAD(NO)         RESIDENT(YES)
       USAGE(NORMAL)       USELPACOPY(NO)
       STATUS(ENABLED)     CEDF(YES)
       DESCRIPTION(INTUNE VERIFY INSTALLATION ROUTINE)
*
ADD    GROUP(BMCINTUN) LIST(BMCTNLST)
APPEND LIST(BMCTNLST) TO(BMCTNLST)
LIST LIST(BMCTNLST)
```

Update the Program Load Table Definitions

Add a new entry to the existing Program Load Table (PLT) or create a new PLT for the InTune second stage initialization program (TC00CPLT), and then specify that CICS use this PLT by modifying the System Initialization Table (SIT). This step ensures that the InTune exit programs are readily available when needed.

1. Define the InTune entry in an existing PLT or a new PLT. The following is an example entry. Note that the InTune program is specified as a second-stage PLT entries.

Figure 2-11 Sample PLT Entry

```
PLTPI    DFHPLT TYPE=INITIAL,SUFFIX=PI
*   You may have First state entries here
****2ND STAGE****************************
         DFHPLT TYPE=ENTRY,PROGRAM=DFHDELIM
*   Other entries for Second stage here
*---INTUNE ENTRY
         DFHPLT TYPE=ENTRY,PROGRAM=TC00CPLT
*
         DFHPLT TYPE=FINAL
         END
```

2. Assemble the PLT using your JCL for CICS/ESA tables.

3. If you created a new PLT in steps 1 and 2, modify the SIT to specify the PLT, where *nn* is the suffix you chose at assembly time.

   PLT=*nn*

4. Assemble this SIT using your JCL for CICS/ESA tables.

Task 10- Assemble and Link User Exits for Adabas, Datacom, or Natural

In this step, you will assemble and link exits which enable InTune to sample Adabas, CA-Datacom, and Natural environments.

1. Use Table 1 to decide which *hilevel*.BBSAMP members you need for your environment. Copy those members to your private JCL library.

Table 2-3 Exit Members in BBSAMP

To use InTune with...	Use JCL member...	To assemble exit...
Adabas Release 4.6	TNUADA$A	TNUADA46
Adabas Release 5.3	TNUADA$A	TNUADA53
Adabas Release 6.1	TNUADA$A	TNUADA61
Adabas Release 6.2	TNUADA$A	TNUADA62
CA-Datacom Release 8.1, 9.0	TNUDCM$A	TNUDCM00
Natural Releases 2.1.*x*	TNUNAT$A	TNUNAT21
Natural Releases 2.2.*x*	TNUNAT$A	TNUNAT22
Natural Releases 2.3.*x*	TNUNAT$A	TNUNAT23

2. Make any changes required by your site in the exit member(s).

Note

If you are using an exit for Natural, you must add the linked names of the Natural nuclei. Instructions for doing this are at the top of each member.

3. Modify the JCL member(s) by following the instructions at the top of each member.

4. Submit the JCL to assemble and link the appropriate exit(s).

Testing the Exit

To verify the operation of an exit, monitor an address space that is accessing the appropriate environment and analyze the data collected. The interactive analysis panels should include characteristic information reflecting the database or 4GL being monitored. Refer to the appropriate chapter in this book for more information.

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Task 11 - Create the InTune Server Space JCL Procedure

The InTune Server Space can be started either as a started task or as a batch job. BMC recommends starting the InTune Server Space as a started task because an initiator is not required.

Note

If you are using InTune in a Sysplex environment, you must run an InTune Server in each OS/390 image where you wish to use InTune. The started task procedure should be located in a shared data set accessible to all OS/390 images. Each server must have the same group name (specified with the GRPNAME parameter in member TUNSSP00). All of the InTune servers that share the same group name can communicate with each other, acting as a single logical server. Servers can only communicate with other InTune servers with the same group name.

1. Copy the *hilevel*.BBSAMP member TNTUNESS (Figure 2-12) to SYS1.PROCLIB or another system procedure library. Rename the member INTUNE or the name that conforms to your site's naming conventions. This is the name you will use when starting the server space.

2. Change ?BBCHILV to the high-level qualifier of your product libraries specified in Step 1.

3. Change ?UBBPARM to the name of the user parameter library. The default is UBBPARM.

4. Change ?BBTUNGIF to the name of the Global Information File. See "Task 5 - Create the InTune Global Information File" on page 2-14.

Note

Before starting the InTune Server Space, you must authorize BBLINK. See "Task 1 - Add the BMC Software Load Library to Your System APF List" on page 2-7

Figure 2-12 JCL for Starting the InTune Server Space (TNTUNESS)

```
//*-------------------------------------------------------------------//
//*     INTUNE STARTED TASK PROCEDURE                                 //
//*                                                                   //
//*     BBLINK MUST BE AN AUTHORIZED LIBRARY                          //
//*                                                                   //
//*     INSTRUCTIONS:                                                 //
//*                                                                   //
//*     - CHANGE ?BBCHILV TO THE HIGH-LEVEL QUALIFIER YOU CHOSE       //
//*       FOR YOUR PRODUCT LIBRARIES.                                 //
//*                                                                   //
//*     - CHANGE ?UBBPARM TO THE NAME YOU ASSIGNED TO THE USER        //
//*       PARAMETER LIBRARY.                                          //
//*                                                                   //
//*     - CHANGE ?BBTUNGIF TO THE NAME OF THE GLOBAL INFORMATION      //
//*       FILE.                                                       //
//*                                                                   //
//*     END OF INSTRUCTIONS                                           //
//*                                                                   //
//*-------------------------------------------------------------------//
//INTUNE PROC PREFIX='?BBCHILV',
//            UBBPARM='?UBBPARM',
//            SERVERID=,
//            TUNSSP=00,
//            START=WARM
//TUNE   EXEC PGM=TNSLOAD,REGION=4000K,
//            TIME=1440,DPRTY=(14,0),
//            PARM='&SERVERID,&TUNSSP,&START'
//STEPLIB  DD DSN=&PREFIX..BBLINK,DISP=SHR
//SYSUDUMP DD SYSOUT=*
//TUNPRINT DD SYSOUT=*
//TUNRDR   DD SYSOUT=(A,INTRDR)
//TUNPARM  DD DSN=&UBBPARM,DISP=SHR
//         DD DSN=&PREFIX..BBPARM,DISP=SHR
//TUNDB    DD DISP=SHR,DSN=?BBTUNGIF
//TUNSAMP  DD DISP=SHR,DSN=&PREFIX..BBSAMP
//SYSEXEC  DD DISP=SHR,DSN=&PREFIX..BBSAMP
//SYSTIN   DD DUMMY
//SYSTSPRT DD SYSOUT=*
//TUNLOG   DD SYSOUT=*
```

Table 2-4 describes the InTune job control statements.

Table 2-4 Job Control Statement Description

Job Control Statement	Description
INTUNE PROC	Identifies the startup procedure.
TUNE EXEC	Invokes the program TNSLOAD which starts the InTune Server Space.
STEPLIB DD	Specifies the library created during the installation process that contains the InTune load modules. The library must be APF authorized. This statement is not needed if the InTune library is included in the LINK list.

Table 2-4 Job Control Statement Description

Job Control Statement	Description
SYSUDUMP DD (Optional)	Provides for some local dumps from InTune. These dumps may be required if you contact BMC Software Customer Service for help.
TUNPRINT DD (Optional)	Provides for a local printer for InTune.
TUNRDR DD	Specifies an internal reader for the batch job option.
TUNPARM DD	Specifies the library containing parameters for the InTune Server Space (UBBPARM).
TUNDB	Specifies the name of the Global Information File (GIF).
TUNSAMP	Specifies the library containing sample members, including information used by InTune (BBSAMP Library).
SYSEXEC	Specifies the library containing sample members, including procedures used by InTune (BBSAMP Library).
SYSTIN	Required for internal REXX procedure.
SYSTSPRT	Required for internal REXX procedure.
TUNLOG	Internal server logging facility.

Table 2-5 describes the parameters.

Table 2-5 Parameter Description

Parameter Name	Description
SERVERID=	Overrides TUNSSP00 value
TUNSSP=xx	Change this to specify the suffix of a different parameter library. For example, TUNSSP=02 specifies that TUNSSP02 is used.
START=WARM|COLD	Specify WARM for a normal start; specify COLD for all pending monitors to be cancelled.

Completing the Customization Worksheet

This worksheet contains spaces to record the information necessary to customize InTune 2.2. Complete this worksheet as an aid to collecting and maintaining installation information.

Table 2-6 InTune Customization Information

InTune Libraries (Record the following information for reference)	
hilevel data set qualifier for InTune (used throughout customization)	
InTune REXX start-up EXEC location and name (used to start the InTune TSO Client Space)	
InTune Server Space JCL procedure location and name (used to start the InTune Server Space)	
Global Information File (GIF) name (used by InTune REXX start-up EXEC and Server Space JCL)	
General Parameters (The following parameters reside in the UBBPARM member TUNSSP00)	
KEY (Password from product documentation)	
SERVERID (InTune Server Space name)	
START (Perform a WARM or COLD start)	
MAXREQ (maximum number of concurrent monitor requests)	
CAPS (OFF for mixed-case messages, ON for all caps)	
QTLIMIT (Queued monitor requests cancelled after specified number of hours)	
DSNPREFX (Prefix appended to all monitor data sets)	

Table 2-6 InTune Customization Information

CICSNAME (CICS EXEC PGM= name if not IBM default)	
IMSNAME (IMS EXEC PGM= name if not IBM default)	
Sysplex Parameters (The following sysplex parameters reside in the UBBPARM member TUNSSP00)	
SYSPLEX (YES or NO for Sysplex support)	
GRPNAME (1-8 character XCF Group name)	
MEMNAME (1-16 character XCF Member name)	
Security Information (The following security parameters reside in the UBBPARM member TUNSSP00)	
SECURITY (security level - NONE, LOCAL, REMOTE, or BOTH)	
SECCLASS (general resource class name)	
SECPREFX (security prefix - first node of SAF resource name)	
SECDUSER (default user name)	
SECDGRP (default group name)	
4GL Information (The following information is used to assemble and link user exits)	
Adabas Version(s)	4.6 5.3 6.1 6.2 _____
Adabas Linkedit names	
Natural Version(s)	2.1 2.2 2.3 _____
Natural Macro library name	
CA-Datacom Version(s)	8.1 9.0 _____

Table 2-6 InTune Customization Information

DB2 Information (The following information is required to extract DB2 SQL and EXPLAIN information)	
SSID (DB2 Subsystem identifier)	
Release version(s) (DB2 release version)	2.3 3.1 4.1 5.1 ____
DB2 load library (ex: DSN410.RUNLIB.LOAD)	
DSNTIAD library (Library accessed by the DSNTIAD application)	
DSNTIAD Plan (Plan name of the DSNTIAD application) **Note:** A DB2 administrator or other person with sufficient authority is required to update the DSNTIAD plan and grant authority.	

Post-Customization Instructions

Once you have completed the customization steps explained in this chapter, you can begin using InTune. The following sections describe how to start InTune and verify a successful installation:

- GRS Considerations
- Implementing SAF Security for InTune
- Providing InTune with Access to System and Application Resources
- Starting the InTune Server Space
- Starting the InTune TSO Client
- Setting Up InTune Profile Parameters

GRS Considerations

InTune issues enqueues that are SYSTEMS wide (GRS), with the major names of INTUNE and DAMTBSVS. To preserve the integrity of the User Information File and the Global Information File, these enqueues must be honored and cannot be converted to SYSTEM wide.

Implementing SAF Security for InTune

In addition to standard OS/390 security, you can also configure InTune to use the IBM System Authorization Facility (SAF) to access your security system and determine if a request should be allowed or denied. SAF supports RACF, CA-ACF2, and CA-Top Secret.

InTune makes SAF calls to determine three conditions:

- Is the user authorized to access an InTune address space?
- Is the user authorized to monitor a specific job or subsystem?
- Is InTune allowed to open a load library for Csect resolution?

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InTune Security Options

InTune security parameters are specified in *hilevel*.UBBPARM member TUNSSP00. There are five security parameters that must be specified:

- SECURITY specifies the InTune access authority options for local and remote systems.
- CLASS specifies the security class name.
- SECPREFX specifies the resource name prefix.
- SECDUSER defines a default user.
- SECDGRP defines a default group.

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Table 2-7 describes these security parameters.

Note

If you are using CA-ACF2 as your security manager, you must activate the MUSASS (multi-user single address space system) privilege in the LID (login ID). This privilege indicates that the address space can accept sign-ons for users, and is necessary so that proper validation can occur. With the MUSASS privilege activated, validations are performed using only the user ID that is associated with the OS/390 task.

Table 2-7 InTune Security Parameters

Parameter	Description
SECURITY	There are four options available for InTune security: • NONE - No security is used on the local system. Security information is passed to remote systems. • LOCAL - Verifies access authority for local resources by local users only. Requests from remote systems are not checked. • REMOTE - Verifies access authority for remote users only. Access to local resources by local users are not checked. • BOTH - Access to resources is checked for both local and remote users.
CLASS	InTune uses a general security class with a default class name of FACILITY. This class is predefined to RACF. If you use a different security system, or if you use a different security class, the class must be defined for that system.
SECPREFX	You may specify a prefix to the resource name to differentiate InTune resources from other resources with the same security class. The prefix must be one to eight characters in length. The default prefix is BBINTUNE.
SECDUSER and SECDGRP	In multi-system environments, a user or group might be defined on one system and not on another. If an inbound request from a remote system contains an unidentified user or group, InTune uses a default user ID defined in TUNSSP00. The default user or group ID is logged on when the InTune Server Space is activated and is logged off when the server is stopped. Any security violation information is saved using the default user or group ID.

Note

You must restart InTune after any changing the security options.

The following SAF definition is used to verify that a user has access to an InTune Server:

Example

'secprefix.serverid.function.resource'

All security calls are done with an access intent of READ.

The following subsections describe the SAF definition nodes.

SECPREFIX

The security prefix defined in *hilevel*.UBPARM member TUNSSP00. The default prefix is BBINTUNE.

SERVERID

The InTune Server ID defined in *hilevel*.UBPARM member TUNSSP00.

FUNCTION and RESOURCE

Table 2-8 describes the keywords for the FUNCTION and RESOURCE parameters of the SAF definition.

Table 2-8 FUNCTION and RESOURCE Keywords

Function	Resource	Description
ACCESS	None	Defines who is allowed to access the InTune Server Space. This includes obtaining InTune-related information, Active Jobs information, and monitor status information. The RESOURCE node is not required for this function.
MONITOR	jobname	Defines who is allowed to schedule monitor requests for particular jobs.
CANCEL	jobname	Defines who is allowed to cancel a monitor request for particular jobs.

Table 2-8 FUNCTION and RESOURCE Keywords

Function	Resource	Description
ADMIN	None	Defines who is allowed to access the InTune Administration functions. The RESOURCE node is not required for this function.
GIF	CSECT PSEUDO CSH TUNSDEFS TUNUDEFS	Indicates who is permitted access to the InTune administration information stored in the Global Information File (GIF). The following resources apply: • CSECT verifies that the user is authorized to assign functional descriptions to Csects. • PSEUDO verifies that the user is authorized to group related program modules into Pseudo Groups. • CSH verifies that the user is authorized to add content-sensitive online help. • TUNSDEFS verifies that the user is authorized to access system default settings. • TUNUDEFS verifies that the user is authorized to access user default settings.

Example SAF Definition

The following syntax shows the resource name sent to SAF for a request to monitor the job PROD1:

Example

```
BBINTUNE.INTUNE.MONITOR.PROD1
```

Validating Security Requests

Monitoring session requests originating from InTune TSO clients are placed in a queue associated with a particular InTune server. When the job to be monitored is detected, the actual monitor session is initiated. The following sections describe how the monitor requests are validated for security.

In a Local Environment

When the TSO Client sends a request, a security call is made from the TSO Client to determine if a user has access to the local InTune Server *before* the request is sent to the server. The userid is “inherited” from the TSO Client and used to identify and validate all security requests for all processing with the exception of the actual monitoring process.

If access is granted, the inherited userid is logged on to the local InTune Server; if access is not granted, the logon fails. If the logon fails for any reason, the DEFAULT USERID (which was assigned globally to the server when the InTune Server started up) is used.

If a request is sent to a remote InTune Server, a security call is made before the request is sent. If access is granted, the user is logged on to the remote system. If the user is not defined on the remote system, the default user ID is used. If the default userid was not available for any reason, the userid of the server is used. Once the request has been verified on the remote system, a security call is made to determine if the user is allowed to invoke a monitor for the requested job on the remote system.

In a Sysplex Environment

In a sysplex environment, InTune may use multiple servers to process a TSO Client request. Security validations occur not only on the system that initiates the request, but also on the system that processes the request.

For example, if Joe Smith wants to invoke a monitor, and his TSO userid is JOES, the following security validation is performed:

- If Joe Smith was also defined as JOES on the target system, the userid inheritance was successful and validations are performed on the target server using the security controls that exist there.

- If JOES is not defined on the target system, the default userid will be used. If the default userid is not available, the server userid is used.

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- If JOES was defined, but belongs to someone other than Joe Smith, the inheritance was physically successful but logically incorrect. JOES will nonetheless be used to verify access on behalf of Joe Smith.

Providing InTune with Access to System and Application Resources

InTune components require access to specific system and application resources to initiate and perform monitor requests. The following sections describe the access rights you need to specify for specific InTune components.

Providing Access to Application Load Libraries

InTune checks if it is authorized to read system or user data sets. If it is not authorized, InTune does not attempt to read those data sets. However, this affects the Csect resolution function of InTune so that none of the modules contained in the restricted data sets are resolved in Csects.

BMC strongly recommends that the InTune started task have OPERATOR authority (or equivalent authority level if you are using CA-ACF2 or TOPSECRET) for InTune's RACF User ID. The security administrator should grant the necessary authority. Refer to "Task 2 - Specify Password and Server Space Parameters" on page 2-8.

If you do not grant OPERATOR authority, the InTune started task userID must have the following authority:

- ALLOCATE and UPDATE authority for all monitor data sets.
- UPDATE authority to the GIF.
- UPDATE authority to all user's UIFs.
- READ access to the installation libraries.

- READ access to all load libraries (including LINKLIST, LPALIB, and CSSLIB) for the applications that are to be monitored.

Note

If you are using CA-ACF2 as your security manager, you must activate the MUSASS (multi-user single address space system) privilege in the LID (login ID). This privilege indicates that the address space can accept sign-ons for users, and is necessary so that proper validation can occur. With the MUSASS privilege activated, validations are performed using only the user ID that is associated with the OS/390 task.

The userid that secures the started task running on the InTune Server needs READ access to the load libraries that are being referenced by the job being monitored. This means all libraries in the STEPLIB concatenation as well as all libraries that are available by other association, such as LINKLIB, require READ access.

DB2 Binds and Grants

If you are using InTune in a DB2 environment, you must specify DB2 system information, bind the TNDB2 plan, and grant authority to PUBLIC. This will allow InTune to display SQL and Plan information. See “Task 8 - Create DB2 Definitions” on page 2-19 for more information.

Working with InTune Datasets

InTune stores information in both User Information Files (UIFs) and Global Information Files (GIFs). The UIF stores user-specific information such as monitor definitions. A UIF is created for a particular user the first time that user executes InTune. The GIF stores site-wide information, such as user-written online help. The following sections describe the security considerations for these files.

User Information File (UIF)

A UIF is dynamically allocated on demand and dynamically de-allocated when the InTune TSO Client session terminates.

When a user first invokes the InTune TSO Client, this dataset is uniquely established. This process includes allocation of physical disk space, creating a name for the dataset, and initializing the contents of the file. This VSAM Linear Dataset contains data relative to user specific InTune characteristics.

Permission to ALLOCATE, UPDATE and READ this cluster must be made for any userid invoking the InTune TSO Client, and for the address space userid associated with the InTune Server.

Because this dataset is dynamically allocated to the DDNAME: TUNTABLE, there is no JCL that identifies this dataset by its DDNAME or its dataset name (DSN). You must examine the PARM member TUNSDEFS to determine the dataset name that will be used when the dataset is allocated to each user that invokes the InTune TSO Client.

Global Information File (GIF)

The GIF is established when InTune is installed. The DDNAME for this VSAM cluster as it appears in the server Started Task JCL is TUNDB. This VSAM Linear Dataset contains data relative to the entire InTune system execution. It is created during product installation, but it is initialized the first time a user executes InTune.

Permission to ALLOCATE, UPDATE and READ this cluster must be made for any userid invoking the InTune TSO Client, and for the address space userid associated with the InTune Server.

Monitor Data Sets

Once sampling has been completed for a monitor definition, the data is stored in a monitor data set pointed to by the User Information File (UIF). The Interactive Analysis Facility formats this data into a set of panels that displays the information in a format that you can use to solve performance problems.

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InTune constructs the monitor data set when you invoke a monitor. Use one or more of the variables to differentiate data from different invocations of one monitor profile. If you do not use quotes around the value you specify in the monitor data set field, InTune appends your user prefix to the beginning of the data set name when you invoke a monitor.

The default value is &USERID.&PROFILE.&SYSDATE.&SYSTIME.

Note

If the DSNPREFX parameter is specified in BBPARM member TUNSSP00, a prefix is appended to the data set name even if you specify a fully quoted data set name. See “Task 2 - Specify Password and Server Space Parameters” on page 2-8.

InTune automatically allocates the monitor data set if it does not exist at the time the monitor is invoked. If you want to preallocate the data set, use the following DCB attributes:

Record format VB

Record length 4096

If necessary, you may specify the SMS data, management, and storage classes for allocating monitor data sets.

Note

You can have only one monitor request active at one time which points to a particular data set. To avoid conflict, use separate monitor data sets for every monitor definition.

Sharing Global Information Files

The Global Information File (GIF) is the file that InTune uses to store site-wide information that is used by InTune TSO Clients and the InTune server. The GIF is also used to store pending monitor requests.

In a sysplex environment, there is an InTune Server for each OS/390 image participating in the sysplex. All InTune Servers and InTune TSO Clients within a single-sysplex InTune group must use the same GIF. You define the InTune sysplex group using the GRPNAME keyword in the UBBPARM member TUNSSP00. GRPNAME defines which Cross-system Coupling Facility (XCF) group the InTune Server uses for cross system communication within a sysplex.

The first InTune Server that starts within a XCF group assigns the name of the GIF for that InTune group. When another InTune server that associates itself with the XCF group starts up, it checks to see if its GIF matches that of the group. If not, the InTune server terminates XCF support (the server remains active but runs in local mode). The name of the GIF is assigned to that XCF group until all of the InTune servers in the group have terminated. Once the last InTune Server in the group has terminated, the GIF name is removed.

When InTune is installed, the name of the GIF is placed in the InTune start-up exec, BACTUN. Each time a InTune TSO Client is invoked, the GIF name is compared with the GIF of the InTune Server. If they do not match, the TSO Client is presented with a message. If the you see this message, report it to the individual responsible for maintaining InTune at your site. You can still use InTune, but it is not recommended.

If you wish to run multiple levels of InTune, it is recommended to use separate GIFs and separate XCF groups. Should you choose this approach, you will also require separate start-up execs for the InTune TSO Client.

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Starting the InTune Server Space

The InTune Server Space maintains deferred monitor requests, runs monitors, and records the resulting sample data from the monitors. Before initiating a monitor request, the InTune Server Space must be started. You may start the Server Space either as a started task or as a batch job. BMC Software recommends that you run the Server Space as a started task (see “Task 2 - Specify Password and Server Space Parameters” on page 2-8 for more information).

Note

The Server Space does not have to be active to run the Interactive Analysis component of InTune.

Start the InTune Server Space with an OS/390 START command, as shown in this example:

Example

/S *INTUNE*

where ***INTUNE*** is the name of the started task procedure established in “Task 2 - Specify Password and Server Space Parameters” on page 2-8.

Note

Before starting the InTune Server Space, you must authorize BBLINK. See “Task 1 - Add the BMC Software Load Library to Your System APF List” on page 2-7.

The InTune Server Space address space remains active until you issue a Stop command. BMC Software recommends that you start the InTune Server Space at IPL and leave it up continuously. Unless a monitor request is active or a TSO user requests information from the Server Space, InTune uses very few system resources.

Using InTune in a Sysplex environment

You must run an InTune Server in each OS/390 image where you want to use InTune. The started task procedure should be located in a shared data set accessible to all OS/390 images.

Starting the InTune TSO Client

To invoke InTune under TSO, you must be running ISPF. InTune requires a TSO region size of at least 4MB. Under TSO, InTune can be invoked from MainView or from ISPF.

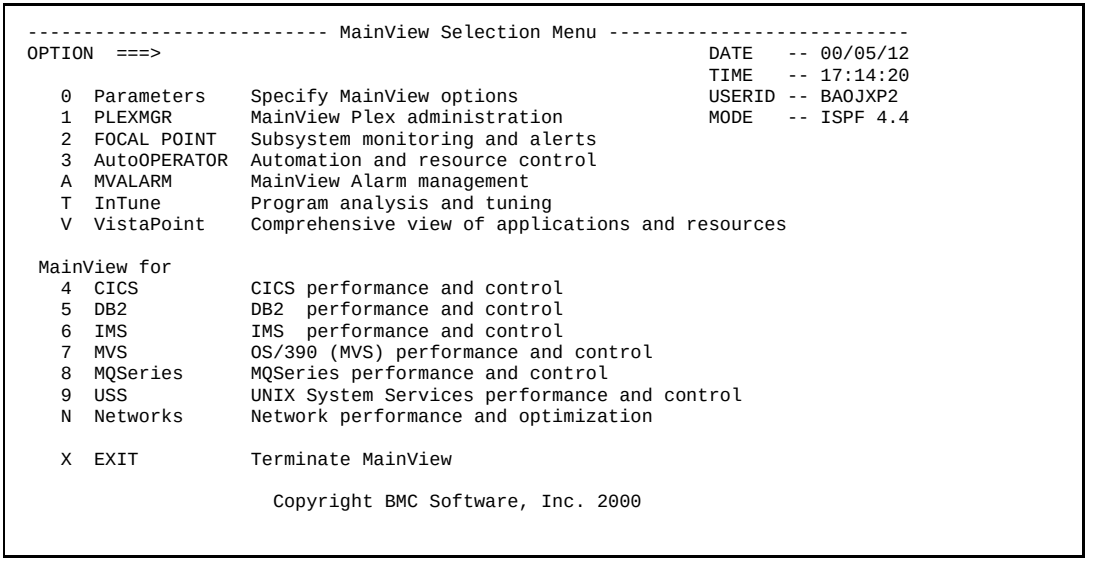
Starting InTune from MainView

If you have the MainView product installed, select Option T from the MainView Selection Menu (Figure 2-13).

Note

If InTune has been installed outside of MainView, the MainView Selection Panel may need to be modified to reflect the settings shown in Figure 2-13.

Figure 2-13 MainView Selection Menu



Starting InTune from ISPF

Type the following TSO command in the ISPF COMMAND field:

TSO EXEC *'hilevel*.BBCLIB(INTUNE)'

where **INTUNE** is the name of the TSO REXX EXEC specified during customization.

Note

This is the TSO EXEC used to execute the CLIST created in "Task 7 - Create the REXX Startup EXECs for Invoking the InTune TSO Client" on page 2-17. Consult your InTune System Administrator for the correct name and location of the CLIST.

You can copy the start-up procedure from *hilevel*.BBCLIB to a library used by your TSO users.

Note

The first time a user invokes InTune, the User Information File Allocation panel is displayed.

When InTune has initialized, the Primary Option Menu (Figure 2-14) is displayed. All InTune functions are accessed from this menu.

Figure 2-14 Primary Option Menu

```
InTune ---------------------- Primary Option Menu ----------------------------
OPTION  ===>

   0  Parameters      - Enter user-specific parameters        Userid: BAOMXY2
                                                           Server ID: INTUNE
   1  Monitor         - Create and analyze Monitor Sets       Status: ACTIVE
                                                            Release: 2.2.0
   2  Active          - Select an active job to monitor
   3  Registration    - Register source listings
   4  Grouping        - Define groups of monitors
   5  External        - Analyze other user's monitor files

   G  Global          - Global monitoring and listing registration
   A  Administration  - InTune system administration
   M  Messages        - List InTune messages
   T  Tutorial        - InTune tutorial

                                                  Copyright 1996, 2000
Enter an option or press END to exit                BMC Software, Inc.
```

Setting Up InTune Profile Parameters

You can change your InTune profile default values to customize your InTune profile. Any changes you make are saved in your ISPF profile data set, so they affect only your user ID.

Default values are set as described in Chapter , “”. To change these default values, select Option 0 from the Primary Option Menu.

The Profile Parameters panel (Figure 2-15) is displayed and shows your current profile settings:

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Figure 2-15 Profile Parameters Panel

```
InTune ---------------------- Profile Parameters -----------------------------
COMMAND ===>
                                                              Status: INACTIVE
                                                                   More:     +
  General
    InTune Server ID  ===> INTUNE         Confirm deletes   ===> Y
    Invoke monitor    ===> NO             (when exiting Monitor Criteria panel)
    Batch reports     ===> N              (automatically generate reports)

  Active Jobs Panel
    Select command    ===> ISF ST /

  Monitor Data Set Options
    Monitor data set  ===> &PROFILE.&SYSDATE.&SYSTIME
    Tracks primary    ===> 20             Tracks secondary  ===> 20
    Data set generic  ===> SYSALLDA       Volume serial     ===>

    SMS Data Class    ===>
    SMS Mgmt Class    ===>
    SMS Stor Class    ===>

 Online Reporting Options
   Delay details     ===> ON             Instruction group ===> STMT
   CodeView mode     ===> CSECT          Column totals     ===> OFF
   Auto scale        ===> Y

 Batch Reporting Options
   Analysis option   ===> NORMAL         Monitor History   ===> Y
   Title             ===>
   TaskView          ===> Y              TranView          ===> Y
   DelayView         ===> Y              CodeView          ===> Y
   DataView          ===> Y              Linklist          ===> Y
   ModView           ===> Y              PoolView          ===> Y

 Batch Options for TaskView
   Code Detail       ===> N              Delay Detail      ===> N
   Task  1           ===> *              Task 2            ===>
   Task  3           ===>                Task 4            ===>

  Batch Options for DelayView
    Delay details     ===> OFF

  Batch Options for CodeView
    All or top 5      ===> Y              CodeView mode     ===> CSECT
    Histogram Csect 1 ===>                Histogram Csect 2 ===>
    Histogram Csect 3 ===>                Histogram Csect 4 ===>

 Batch Options for DataView
   DB2 Code Detail   ===> Y

  Batch Options for TranView
    Code Detail       ===> N              Delay Detail      ===> N
    Transaction 1     ===> *              Transaction 2     ===>
    Transaction 3     ===>                Transaction 4     ===>

 Batch JES Parameters
   Lines per page    ===> 66             Sysout class      ===> A
   Column width      ===> 132            Sysout form       ===>
   Destination       ===>
   JES writer name   ===>

 Batch Job Cards
    ===> //TUNBATCH JOB (0000),'INTUNE BATCH JOB',
    ===> // CLASS=A,MSGCLASS=A
    ===> //TUNJCL JCLLIB ORDER=USER.PROCLIB
    ===> //*
```

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Table 2-9 describes the fields on the Profile Parameters panel:

Table 2-9 Profile Parameters Fields

Field Name	Description
General	
InTune Server ID	Type the InTune Server Space identifier established during installation. The default Server Space identifier is INTUNE. See “Starting the InTune Server Space” on page 2-44 for more information.
Confirm deletes	Specify Y (default) to display a confirmation pop-up window when you perform a destructive action, such as deleting a monitor definition or a monitor data set. Specify N for deletes without confirmation.
Invoke Monitor (when exiting Monitor Criteria Panel)	Specify YES to automatically invoke the monitor when you exit the Monitoring Criteria panel. Specify CONFIRM to display a confirmation message before the monitor is invoked. Specify NO (default) to exit the Monitoring Criteria panel without invoking the monitor. See Chapter 5, “Setting Up a Monitor Definition”.
Batch reports	Specify Y to create a preset series of reports in batch after the monitor terminates. Specify N (default) if you do not want the reports. You can override this value when you set up a monitor definition. See “Creating a Monitor Definition” on page 5-3 for more information. If you specify Y, you must complete the customization step described in “Task 4 - Create the InTune Batch Report Procedure” on page 2-12.
Active Jobs Panel Select command	Specify the Display Active command string used when monitoring an active job. Use a forward slash “/” in place of the jobname (ex., SDSF /, IOF /). The command string can contain up to 70 characters. This parameter defines the command to be executed when the S line command is issued in the Active Jobs panel. The command will be issued on the local system, even if the selected job is running on a different system in the sysplex. See “Active Jobs Select Command” on page 6-16.
Monitor Data Set Options	

Table 2-9 Profile Parameters Fields

Field Name	Description
Monitor dataset	Specify the name of the data set to receive the output data from the monitor session. Each node of the monitor data set may contain either fixed text or one of the following variables: • **&USERID** - TSO ID of the user who initiated the monitor request • **&PREFIX** - TSO prefix or value specified in TUNCALL PREFIX keyword. • **&PGMNAME** - Program name obtained at ATTACH time • **&PROFILE** - Name of the monitor definition profile used to start the request • **&SYSTIME** - Time that a request was initiated, in the following format: ‘T’hhmmsst • **&SYSDATE** - Date that a request was initiated, in the following format: ‘D’ccyyddd • **&SYSNAME** - The OS/390 system name • **&JOBNAME** - The name of the job • **&STEPNAME** - The name of the job step • **&PROCSTEP** - The name of the procedure step • **&JOBID** - The JES job identification number See “Naming Monitor Data Sets” on page 2-56 for more information.
Tracks primary	Specify the primary allocation used for monitor data sets if a data set does not already exist when InTune is invoked. The default value of 20 allows approximately 6400 samples. Note that InTune monitor data sets require 4 tracks for initializing records. Thereafter, 400 samples fit on each track.
Tracks secondary	Specify the secondary allocation used for monitor data sets, if a data set does not already exist when InTune is invoked. The default value is 20.
Dataset generic	Specify the unit type used during allocation of monitor data sets, if a data set does not already exist when an InTune monitor is invoked. The default value is SYSALLDA. Check your site’s requirements for this value.
Volume serial (Optional)	Specify the default volume serial for InTune monitor data sets.
SMS Data Class (Optional)	Specify the SMS data class for the allocation of monitor data sets.
SMS Mgmt Class (Optional)	Specify the SMS management class for the allocation of monitor data sets.
SMS Stor Class (Optional)	Specify the SMS storage class for the allocation of monitor data sets.

Table 2-9 Profile Parameters Fields

Field Name	Description
Online Reporting Options	
Delay details	Specify the initial DETAIL setting upon entering the DelayView panel. The default is ON. You can override this value in the DelayView application. See “Interactive Analysis Option 2 - DelayView” on page 7-20 for more information.
Instruction group	Specify the default size of the group as either STMT for statement-level resolution or a specific number of bytes used by the Histogram function. The default group size is STMT. You can change the default value by overtyping the Group field in the Histogram panel. See “Displaying Csect Activity Locations” on page 7-34 for more information. The listing must be registered to use the STMT option. If a listing is not registered, the group size defaults to 32.
CodeView mode	Specify the initial display mode for the CodeView panel. Possible modes are CSECT, MODULE, PSEUDO, or 4GL. The default is CSECT. You can override this value on the CodeView panel. See “Interactive Analysis Option 3 - CodeView” on page 7-31 for more information.
Column Totals	Specify ON to show numerical column totals for tabular panels. Specify OFF (default) for no column totals. Totals can be displayed using the TOTals primary command.
Auto scale	Controls the Visual field in the relevant Interactive Analysis panels. Specify Y (default) to expand the Visual field to its maximum size for the element with the highest delay, regardless of the percentage of that element's delay. Specify N to represent delays on a scale of 0 to 100 percent.
Batch Reporting Options	

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Table 2-9 Profile Parameters Fields

Field Name	Description
Analysis option	Specify one of the following values: **NORMAL -** Information which is not directly related to the target application is eliminated. Data is reported as follows: • Samples related to delay categories such as Waiting for CPU, LPAR delay, and Swap delay are omitted from reports. • Delayview, TimeView, Dataview, and Modview show all relevant delays for the application. All relevant samples for both active and wait states are reported. • CodeView and related histograms report only active samples, to emphasize the most CPU-intensive portions of the program code. Wait samples, which can mask this activity, are not included. **ALL -** Percentages are calculated based on all samples. This allows you to compare delays occurring when the program is executing in both active and wait states. **ACTIVE -** Percentages are calculated based on samples where the program was actively using CPU. Samples which contain only wait information are filtered out. This allows you to make normalized CPU comparisons of program activity. **WAIT -** Percentages are calculated based on samples where the program was in a wait state. Samples which contain only active information are filtered out. This allows you to make normalized comparisons of program wait activity.
Monitor history	Specify Y (default) to generate the batch history report. Specify N for no report.
Title	Specify a unique title to appear at the top of each page of the report.
TaskView	Specify Y (default) to generate a TaskView report. Specify N for no TaskView report.
TranView	Specify Y to generate a TranView report. Specify N (default) for no TranView report.
DelayView	Specify Y (default) to generate a DelayView report. Specify N for no DelayView report.
CodeView	Specify Y (default) to generate a CodeView report. Specify N for no CodeView report.
DataView	Specify Y (default) to generate a DataView report. Specify N for no DataView report.
Linklist	Specify Y to include the names of the LINKLIST libraries for your installation as part of the DataView report. Specify N (default) for no LINKLIST information.

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Table 2-9 Profile Parameters Fields

Field Name	Description
ModView	Specify Y (default) to generate a ModView report. Specify N for no ModView report.
PoolView	Specify Y to generate a PoolView report. Specify N (default) for no PoolView report.
Batch Options for TaskView	
Tasks 1- 4	Use these fields to select up to four specific tasks to appear in the CodeView, Histogram, DelayView, TaskView, and TranView reports. This field supports the use of the * wildcard character to match multiple characters and the + wildcard character to match any single character. If you want all tasks to appear (default), specify an asterisk (*) in this field.
Code Detail	Specify Y to generate the TaskCode batch report. Specify N (default) for no TaskCode report.
Delay Detail	Specify Y to generate the TaskDelay batch report. Specify N (default) for no TaskDelay report.
Batch Options for DelayView	
Detail details	Specify ON (default) if you want the DelayView report to contain detailed information about the delay causes. Specify OFF if you want the DelayView report to contain only high-level information about delay causes.
Batch Options for CodeView	
All or Top 5	Specify Y to create histograms for the five Csects showing the greatest activity or delay in CodeView. Specify A to create histograms for all Csects reported by CodeView. Specify N to suppress the generation of histograms. Csect histograms are produced in order of descending activity.
CodeView mode	Specify the mode for CodeView batch reports. Possible modes are CSECT, MODULE, PSEUDO, or 4GL. The default is CSECT. See “Interactive Analysis Option 3 - CodeView” on page 7-31 for more information.
Histogram Csects 1-4	Specify up to four Csect names for which you want to create histograms.
Batch Options for DataView	
DB2Detail	Specify Y (default) to generate the DB2 Code Detail report. Specify N for no report.
Batch Options for TranView	

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Table 2-9 Profile Parameters Fields

Field Name	Description
Transactions 1- 4	Use these fields to select up to four specific transactions to appear in the following reports: • CodeView (including histograms) • DelayView • TaskView • TranView This field supports the use of the * wildcard character to match multiple characters and the + wildcard character to match any single character. If you want all transactions to appear (default), specify an asterisk (*) in this field.
Code Detail	Specify Y to generate the TranCode batch report. Specify N (default) for no TranCode report.
Delay Detail	Specify Y to generate the TranDelay batch report. Specify N (default) for no TranDelay report.
Batch JES Parameters	
Lines per page	Specify the number of lines on each page of the batch report. The default is 66.
Column width	Specify the width of the batch reports. The default is 132 characters.
Sysout class	Specify an output destination for the batch reports. This field defaults to an asterisk (*). The asterisk (*) ensures that InTune generated reports using the same SYSOUT class as the jobcard.
Sysout form	Specify a one- to four-character JES form name for the destination to which the report is written.
Destination	Specify the one- to eight-character JES nodename of the destination to which the SYSOUT report is written. In addition, you can specify a one- to eight-character user ID. If you specify a user ID, it must follow the nodename and must be separated from the nodename with a period.
JES writer name	The eight-character JES SYSOUT writer name.
Batch Job Cards	Contains your default ISPF jobcard. Modify these fields as necessary.

Naming Monitor Data Sets

InTune constructs the monitor data set when you invoke a monitor. Use one or more of the variables to differentiate data from different invocations of one monitor profile. If you do not use quotes around the value you specify in the monitor data set field, InTune appends your user prefix to the beginning of the data set name when you invoke a monitor.

For more information on working with monitor data sets, see “Monitor Data Sets” on page 2-41.

Verifying the Installation and Operation of InTune

To ensure that the installation of InTune is correct and complete, perform the Installation Verification Procedure (IVP). The IVP uses the same basic steps you follow for any job to define, invoke, and analyze a test job. By running this procedure, you can familiarize yourself with InTune while verifying that it has been installed properly.

Note

If you used AutoCustomization, you ran an IVP step to validate the load modules in *hilevel*.BBLINK. The IVP described in this section is an additional and different procedure to verify that InTune is functioning properly.

Table 2-10 describes the three BBSAMP members used in the IVP.

Table 2-10 Installation Verification Program BBSAMP Members

BBSAMP Member	Description
TUNCOBOL	JCL to compile the sample COBOL program.
TUNCOB01	Source for sample COBOL program you will be running in the IVP.
TUNIVP1	JCL to run the sample COBOL program for an OS/390 batch environment.

The IVP consists of five steps:

1. Compiling the IVP test program using your installation's COBOL compiler; InTune supports COBOL/VS, COBOL II, and COBOL/370.

2. Creating a monitor definition.

3. Invoking the monitor definition.

4. Modifying the JCL in *hilevel*.BBSAMP member TUNIVP1 and submitting the IVP job.

5. Invoking InTune's interactive analysis and observing the results.

Before running the IVP, check that the following fields on the Profile Parameters panel are set as indicated:

Field	Setting
Monitor dataset	Use a name that conforms to your site's naming conventions. The default is &USERID.&PROFILE.&SYSDATE.&SYSTIME.
Dataset generic	Use a name that conforms to your site's naming conventions. The default is SYSALLDA.
Delay details	ON (default).
CodeView mode	CSECT (default).
Instruction group	STMT (default).
Auto scale	Y (default).
Column totals	OFF (default).

Task 1 - Compile the COBOL Program - TUNCOB01

1. Copy *hilevel*.BBSAMP member TUNCOBOL to your JCL library.

2. Follow the instructions at the top of the member. You must supply the names of your COBOL run-time and compiler load module libraries.

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3. Submit the JCL and verify that TUNCOBO1 compiles with a return code of 0.

   TUNCOBOL performs two functions:

- Allocates two data sets:

  hilevel.COBLIST – contains a listing of the TUNCOBO1 program.

  hilevel.COBLOAD – contains the load module for the TUNCOBO1 program.

Note

If these data sets have already been allocated, they must be deleted before you compile the program.

- Compiles the TUNCOBO1 program into these data sets.

Task 2 - Create a Monitor Definition

1. From the InTune Primary Option Menu, select Option 1, to display the Monitor Definition panel (Figure 2-16).

Figure 2-16 Monitor Definition Panel

```
InTune ------------------ Monitor Definition -------------- ROW 0 to 0 of 0
COMMAND ===>                                                 SCROLL ===> CSR

Primary commands: ADD xxxx, STAtus                          Server ID: INTUNE
                                                               Status: ACTIVE
Line commands: S - Select       A  - Analyze Normal
               I - Invoke       AL - Analyze All          D  - Delete
               H - History      AA - Analyze Active       DD - Delete w/dsns
               C - Copy         AW - Analyze Wait         B  - Batch Reports

LC Profile  Description               Userid   Status     Date        Time
   ________ ____________________________ ________ __________ __________ ________
>-------------------------------------------------------------------------------
******************************** END OF TABLE ******************************
```

2. In the COMMAND field, type

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ADD TUNIVP1

where **TUNIVP1** is the name of the profile you are creating.

The Monitoring Criteria panel is displayed with TUNIVP1 in the Profile field. For a complete explanation of each of the Monitoring Criteria panel fields, see Chapter 5, “Setting Up a Monitor Definition”.

Figure 2-17 Monitoring Criteria Panel

```
InTune ---------------------- Monitoring Criteria ----------------------------
 COMMAND ===>

Specify parameters for monitoring session:                  Profile: MARGTEST
    Description ===>
   Batch reports ===> N (Y or N)
 Monitor dataset ===> '&USERID.&PROFILE.&SYSDATE.&SYSTIME'

Specify target name: (Job required)
   Job ===>          Step ===>          Pstep ===>          Prog ===>
     Multi-Step Monitoring ===> NO  (YES or NO)
Specify target systems in SYSPLEX: (default is local system only)
System ===>                 >                  >                 >

Specify parameters for target job name:
         Monitor duration ===> 60S (Used as estimate)
      Monitor entire step ===> NO     (Yes or No)
        Number of samples ===> 6000
 DD name for load modules ===>

Tab to the environment for additional monitoring options and press
ENTER to select:   All Jobs CICS IMS ADABAS  Natural CA-Datacom

Press END to save changes; enter CANCEL to exit without saving
```

3. Type a description of up to 57 characters in the Description field.

4. In the Job field, type the name of the job you will use to run the TUNCOB01 program. The default is TUNIVP1.

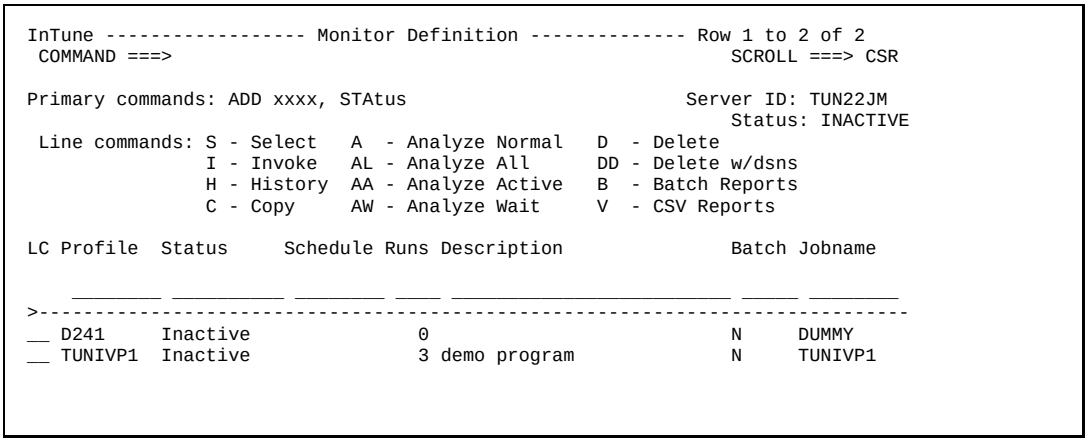
5. Press End to save this monitor definition and return to the previous panel. The Monitor Definition panel is displayed.

6. Verify that the new monitor definition TUNIVP1 is now listed on the Monitor Definition panel, as shown in Figure 2-18.

Task 3 - Invoke the Monitor Definition

1. On the Monitor Definition panel, type the I line command in the LC field next to the TUNIVP1 profile entry (Figure 2-18).

Figure 2-18 Invoking a Monitor Definition



2. Press **Enter**.

   You will see two messages:

   - A TSO Notify message indicating monitoring has been deferred for this monitor request:

     TN0130I Monitoring deferred for profile: TUNIVP1

   - A box containing the message Monitor Started/Queued.

     The Status field now displays Waiting. The monitor request is waiting for the batch job to start. When the job starts, the monitor request becomes active and starts to gather data.

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Task 4 - Modify the TUNIVP1 JCL and Submit the IVP Job

1. To split the screen, press **PF2**.
2. Using ISPF Edit, display *hilevel*.BBSAMP member TUNIVP1.
3. Follow the directions at the top of the member.
4. Submit the JCL.

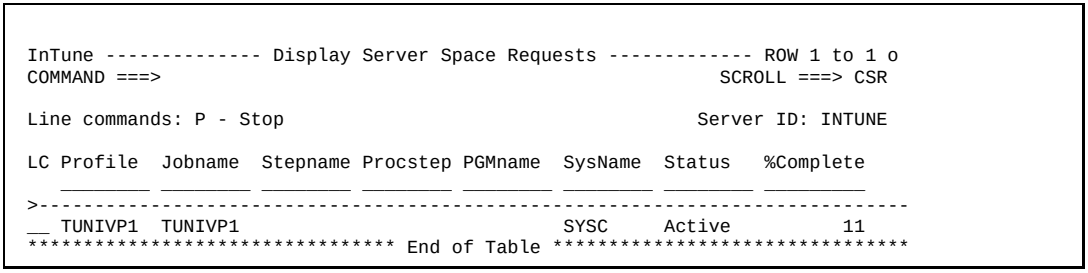
Figure 2-19 JCL for Job TUNIVP1

```
//TUNIVP1  JOB (ACCT),PGMRNAME
//*-------------------------------------------------------------------*
//*       INSTALLATION VERIFICATION JOB
//*
//*       THIS JOB WILL WORK WITH THE IVP PROCESS IN THE USER'S
//*       GUIDE. MAKE THE FOLLOWING CHANGES AND SUBMIT THE JOB.
//*
//*       1 ADD A VALID JOB CARD. SPECIFY THE SAME JOBNAME THAT
//*         IS USED WHEN DEFINING THE MONITOR DEFINITION.
//*
//*       2 CHANGE "*HILVL*" TO THE HIGH LEVEL QUALIFIERS YOU USED
//*         WHEN INSTALLING INTUNE
//*
//*       3 CHANGE "*COBOL*" TO THE HIGH LEVEL QUALIFIERS YOU USE
//*         FOR THE INSTALLATION'S COBOL RUN-TIME LIBRARY
//*
//*       4 SELECT THE APPROPRIATE RUNTIME LIBRARY FOR YOUR COBOL
//*         ENVIRONMENT.
//*
//*-------------------------------------------------------------------*
//IVP     EXEC PGM=TUNCOB01
//STEPLIB  DD  DISP=SHR,DSN=*HILVL*.COBLOAD
//         DD  DISP=SHR,DSN=*COBOL*.COB2LIB <=== COBOL/II
//*        DD  DISP=SHR,DSN=*COBOL*.VSCLLIB <=== COBOL/VS
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SYSOUT   DD  SYSOUT=*
//BIGBLOCK DD  DSN=&DOUT1,UNIT=SYSDA,
//             SPACE=(CYL,(2,1)),DISP=(,DELETE),
//             DCB=RECFM=FB
//*-------------------------------------------------------------------*
//*FOR THIS EXAMPLE - NOTICE THAT BLOCKSIZE IS SUPPLIED, BUT NOT USED
//*-------------------------------------------------------------------*
//UNBLOCK  DD  DSN=&DOUT3,UNIT=SYSDA,
//             SPACE=(CYL,(2,1)),DISP=(,DELETE),
//             DCB=(RECFM=FB,LRECL=200,BLKSIZE=4000)
//*
```

5. Switch back to the Monitor Definition panel and type **STA**tus in the COMMAND field.

6. Press **Enter** to display the Display Server Space Requests panel (Figure 2-20):

Figure 2-20 Display Server Space Requests Panel



7. The Status field for the TUNIVP1 monitor request displays Active. The %Complete field displays the progress of the monitor session.

8. To update the display, press Enter. Every time you press Enter, you should see the number under the %Complete field increase.

9. When the monitor request ends, the following TSO Notify message is displayed:

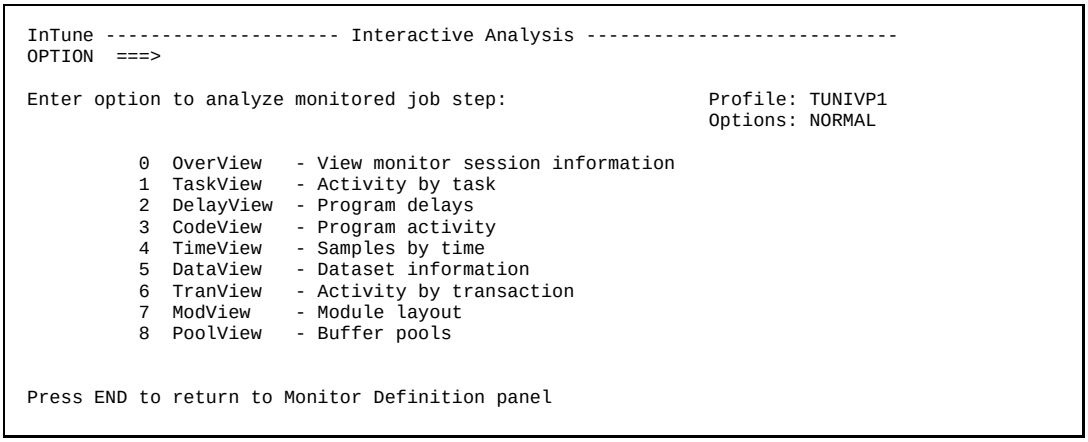
   TN0121I Monitoring completed for profile: TUNIVP1

Task 5 - Invoke the Analyzer and Observe the Results

1. Press **End** to return to the Monitor Definition panel.

   Type one of the analysis line commands (A, AL, AA, or AW) in the LC field next to the TUNIVP1 monitor definition, and press Enter. This loads the collected data into memory. After loading is complete, the Interactive Analysis menu is displayed (Figure 2-21):

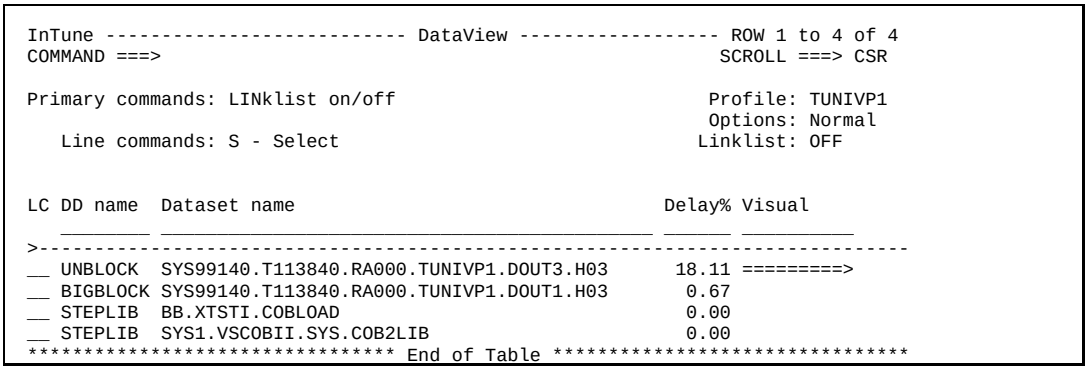
Figure 2-21 Interactive Analysis Menu



For an explanation of each option on the Interactive Analysis menu, see Chapter 7, “Analyzing Monitor Data”.

2. Select Option 5 (DataView) to display the DataView panel (Figure 2-22):

Figure 2-22 DataView Panel



DataView displays a list of all the DD names and their individual data sets monitored by InTune for the TUNIVP1 job. Notice that UNBLOCK and BIGBLOCK are the only two DD names causing any type of delay.

3. Type S for the UNBLOCK DD statement.

4. Press **Enter** to display the Dataset Details panel (Figure 2-23):

Figure 2-23 Dataset Details for the UNBLOCK DD Name

```
InTune ---------------------- Data Set Details ------------ Row 1 to 27 of 30
COMMAND ===>                                                  SCROLL ===> PAGE

DDNAME: UNBLOCK                                             Profile: TUNIVP1

Opened for: PUT LOCATE    Access Method: SAM   Concatenation Count: 0

Data Set Information for: SYS00200.T121424.RA000.TUNIVP1.DOUT3.H04

               File Type: Physical Sequential
             Description: Fixed

------ SMS ------- ------ Allocation ------- ----------- Format ---------------
DATACLAS:          Unit:                 CYL DS Org:         PS Rec FM:      FB
STORCLAS:          Primary:                2 Log Rec Len:   200 Blk Size:   200
MGMTCLAS:          Secondary:              1 Buffer Count:    5 Buf Size:     0
                   Volume Count:           1 Stripes:         0 Concat #:     0
                   Curr Extent Count:      1

           ---------------- Data Set Performance -----------------
             Avg Response Time:       1.89  Avg IOSQ Time:   0.00
                   Active Rate:      68.50  Avg Pend Time:   0.20
                   Total EXCPs:        615  Avg Disc Time:   0.03
            Total Connect Time:     421.50  Avg Conn Time:   1.54

Volume Information for Volume PUBA01 ----------------------------------------

  Unit No.: 8359            Avg Resp Time:   1.72     Avg IOSQ Time:   0.00
  Dev Type: 3390-380          Active Rate:  72.00     Avg Pend Time:   0.20
 Alloc Cnt: 0                     Dev Res:   0.00     Avg Disc Time:   0.03
  Open Cnt: 0                    Dev Util:   0.00     Avg Conn Time:   1.50
   Mounted: PUBLIC
Cache Act.: CFW CAC DFW

****************************** End of Report ******************************
```

Note the number of Total EXCPs.

5. Press **End** to close the Dataset Details panel for UNBLOCK and return to the DataView panel.

6. Type S for the BIGBLOCK DD statement.

7. Press **Enter** to display the Dataset Details panel (Figure 2-24):

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Figure 2-24 Dataset Details for the BIGBLOCK DD Name

```
InTune ---------------------- Data Set Details ------------ Row 1 to 27 of 30
COMMAND ===>                                                 SCROLL ===> PAGE

DDNAME: BIGBLOCK                                           Profile: TUNIVP1

Opened for:               Access Method: NONE  Concatenation Count: 0

Data Set Information for: SYS00200.T121424.RA000.TUNIVP1.DOUT1.H04

              File Type: Physical Sequential
            Description: Fixed

------ SMS ------- ------ Allocation ------- ----------- Format ---------------
DATACLAS:          Unit:                 CYL DS Org:         PS Rec FM:      FB
STORCLAS:          Primary:                2 Log Rec Len:     0 Blk Size:     0
MGMTCLAS:          Secondary:              1 Buffer Count:    0 Buf Size:     0
                   Volume Count:           1 Stripes:         0 Concat #:     0
                   Curr Extent Count:      0

          ---------------- Data Set Performance -----------------
            Avg Response Time:       4.10  Avg IOSQ Time:   0.00
                  Active Rate:       1.75  Avg Pend Time:   0.18
                  Total EXCPs:         60  Avg Disc Time:   0.02
           Total Connect Time:      27.26  Avg Conn Time:   3.89

Volume Information for Volume PUBBC1 ----------------------------------------

  Unit No.: 8396            Avg Resp Time:   4.10     Avg IOSQ Time:   0.00
  Dev Type: 3390-380          Active Rate:   1.75     Avg Pend Time:   0.18
 Alloc Cnt: 0                     Dev Res:   0.00     Avg Disc Time:   0.02
  Open Cnt: 0                    Dev Util:   0.01     Avg Conn Time:   3.89
   Mounted: PUBLIC
Cache Act.: CFW CAC DFW

****************************** End of Report ******************************
```

If InTune is installed correctly, you should notice that BIGBLOCK's Total EXCPs count is considerably less than that of UNBLOCK's.

What Next?

Now that you've verified that InTune is installed correctly, you can learn more about how to use InTune in the following chapters.

Note

BMC Software recommends that all first-time InTune users go through the online tutorial. To view the tutorial, select Option T from the Primary Option Menu.

The following table tells you where to find more information about InTune's features.

To...	See...
Administer global system and user defaults	Chapter 3, "Centralized Administration of InTune"
Navigate within InTune and use the features found in most InTune panels	Chapter 4, "Working in the InTune Environment"
Learn how to define the criteria for an InTune monitor session	Chapter 5, "Setting Up a Monitor Definition"
Start a monitor to sample a target application	Chapter 6, "Invoking a Monitor"
Use InTune's Interactive Analysis Facility to analyze the data from a monitoring session	Chapter 7, "Analyzing Monitor Data"
Work through an example analysis session using the TUNCOB01 demonstration program	Chapter 8, "Working with Interactive Analysis - A Demonstration"
Learn about InTune's additional features, including analyzing external data sets, registering program listings, defining Csects and pseudo groups, and adding content-sensitive help	Chapter 9, "Using InTune's Additional Features"
Start a monitor using TSO commands, batch jobs, or from within a program	Chapter 10, "InTune Open Application Program Interface"
Set up and generate batch reports and spreadsheets	Chapter 11, "Generating InTune Batch Reports"

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To...	See...
Look up delay categories and determine reasons for specific types of delays	Chapter 12, “Using InTune to Tune Your Application”
Use InTune with DB2	Chapter 13, “Using InTune in a DB2 Environment”
Use InTune with CICS	Chapter 14, “Using InTune in a CICS Environment”
Use InTune with IMS	Chapter 15, “Using InTune in an IMS Environment”
Use InTune with Adabas, Natural, and CA-Datacom	Chapter 16, “Using InTune with a Non-IBM Database”

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Centralized Administration of InTune

This chapter describes how to define global default parameters for an InTune user group. This allows for consistent operation of InTune within a group of InTune users. Default values can be defined for both the entire system and for individual users. These values can be defined during customization or at any time thereafter.

Note

You can display the current system and user default values online. See "Viewing System and User Default Values Online" on page 3-14. If the default values supplied with InTune are sufficient, this section may be skipped.

This chapter describes the following topics:

Setting Global System and User Default Values 3-2
System Default Settings 3-4
User Default Settings 3-7
JCL for Updating and Printing Default Values. 3-11
Viewing System and User Default Values Online 3-14

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Setting Global System and User Default Values

The following two *hilevel*.BBPARM members are used to define the default parameters:

- **System Default Settings (TUNSDEFS)** defines settings for the following:

  — User Information File (UIF) allocation options
  — Administration and environmental options

  The system default options are listed in Table 3-1 on page 3-4.

- **User Default Settings (TUNUDEFS)** defines settings for the following:

  — User profile defaults
  — Options for allocating a monitor data set
  — Online and batch report defaults

  The user default options are listed in Table 3-2 on page 3-7.

  The *hilevel*.BBSAMP member TNUXDEFS contains a sample JCL for updating the default settings in the Global Information File (GIF).

Defining and Updating Global Default Values

1. Copy *hilevel*.BBPARM members TUNSDEFS and TUNUDEFS to *hilevel*.UBBPARM.

2. Update TUNSDEFS with the system default values, as shown in Table 3-1 on page 3-4.

3. Update TUNUDEFS with the user default values, as shown in Table 3-2 on page 3-7.

4. Open TNUXDEFS in Edit mode.

5. Change ?HILEVEL to the high-level data set qualifier for BMC Software product data sets.

6. Specify UPDATE in the ACTION= fields for System defaults and User defaults.

7. Submit the JCL.

The Global Information File will be updated with the default settings.

Printing System and User Default Values

To print the current default settings:

1. Open TNUXDEFS in Edit mode.

2. Specify LIST in the ACTION= fields for System defaults and User defaults.

3. Submit the JCL.

The current default value settings will be printed.

System Default Settings

Table 3-1 describes the default system settings for TUNDEFS parameters.

Table 3-1 TUNSDEFS parameters

Parameter	Description
User Information File allocation options:	
DISPLAY_ALLOC_PANEL	Specify **YES** to display the User Information File Allocation panel when a new user first invokes InTune. This allows the user to change the default settings. Specify **NO** to use the default options to allocate the User Information File. The default is YES.
LTDS_TRACKS	Specify the number of tracks to allocate for the size of the User Information File. The default is 90. Note that this value may be changed by SMS constructs if SMS is being used.
LTDS_VOLSER	Specify the volume serial to be used for allocation of the User Information File. If SMS is used, this field may be left blank.
LTDS_MGMTCLAS LTDS_STORCLAS LTDS_DATACLAS	Specify the SMS management class, storage class, and data class for allocation of the User Information File. These fields may be left blank.
MIGRATE_USER_OPTIONS	Specify **YES** to migrate user options from a User Information File of a previous release to the User Information File being allocated for the current release. Specify **NO** if you do not want to migrate user options. The default is YES.

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Table 3-1 TUNSDEFS parameters

Parameter	Description
User administration options:	
UPDATE_GT/DS_CONTENTS	Specify the list of TSO user IDs that are permitted to update the Global Information File (GIF). The default is blank, which allows all users to update the GIF. Multiple values separated by blanks or commas may be specified. This facility should be used as a supplement to standard OS/390 security products such as RACF. The values specified are treated as partial IDs. For example, **Z** grants permission to all users whose ID begins with Z. **Examples**: UPDATE_GT/DS_CONTENTS= Permits all users to update the GIF. UPDATE_GT/DS_CONTENTS=ABCDEF BSD TSG X Permits TSO user IDs starting with ABCDEF, BSD, TSG, or X to update the GIF. Note that If you are using SAF security, the SAF definitions are used. The UPDATE_GT/DS_CONTENTS= parameter is ignored. See “Implementing SAF Security for InTune” on page 2-33 for more information.
OLD_USER_TABLES_ CLUSTER_DSN	Specify the User Information File name pattern from the previous InTune release (1.3). For new users, this should be set to blank. This allows the information in the User Information File to be migrated to the current version. The default is: &PREFIX.TUN21.TABLES For information about using variables, see “Data Set Name Pattern Variables” on page 3-6.
USER_TABLES_CLUSTER_DSN	Specify the VSAM cluster data set name pattern used to allocate the User Information File. The default is: &PREFIX.TUN22.TABLES For information about using variables, see “Data Set Name Pattern Variables” on page 3-6.
USER_TABLES_DATA_DSN	Specify the VSAM data component data set name pattern used to allocate the User Information File. The default is: &PREFIX.TUN22.TABLES.DATA For information about using variables, see “Data Set Name Pattern Variables” on page 3-6.

Table 3-1 TUNSDEFS parameters

Parameter	Description
Set user environmental options:	
BATCH_TERMINAL	Specify the batch terminal type. Specify 3277KN or 3278KN to support Katakana terminals for batch reports. This causes all lowercase characters to be translated to uppercase characters. The default is 3278.

Data Set Name Pattern Variables

You may substitute variables for qualifiers, although variables cannot be substituted as partial qualifiers. Valid variables are:

&PREFIX: A computed variable. If the TSO data set prefix matches the user ID, &PREFIX is set to the user ID. If they do not match, the TSO data set prefix and user ID are concatenated together as the first two qualifiers of the data set name. For example, if the user ID is 'TSOUSER' and the TSO data set prefix is 'TSOFILES', &PREFIX would be 'TSOFILES.TSOUSER'.

&ZXXXXXXX: ISPF variables, such as &ZPREFIX, &ZUSERID, and &ZACCOUNT. ISPF variables must begin with &Z and adhere to data set naming standards.

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User Default Settings

Table 3-2 describes the default system settings for TUNUDEFS parameters.

Table 3-2 TUNUDEFS parameters

Parameter	Description
User profile defaults:	
INTUNE_SERVER	Specify the InTune OS/390 Server Space name. The default is **INTUNE**. The name can be up to eight characters.
CONFIRM_DELETES	Specify **YES** (default) to display a confirmation window when using the **D**elete, **DE**lete, or **R**emove line commands. Specify **NO** if you do not want to confirm deletes.
BATCH_REPORTS	Specify **YES** to automatically submit batch reports after each monitor session ends. Specify **NO** (default) for no automatic batch reports.
DACMD	Specify the default Display Active command string to be used when monitoring an active job. Use a forward slash "/" in place of the jobname (ex., **SDSF /**, **IOF /**). The command string can be up to 70 characters. This parameter defines the command to be executed when the **S** line command is issued on the Active Jobs panel. The command is issued on the local system, even if the selected job is running on a different system in the sysplex. See "Active Jobs Select Command" on page 6-16.
CONFIRM_INVOKE	Specify **YES** to automatically invoke the monitor when you exit the Monitoring Criteria panel. Specify **CONFIRM** to display a confirmation message before the monitor is invoked. Specify **NO** (default) to exit the Monitoring Criteria panel without invoking the monitor.

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Table 3-2 TUNUDEFS parameters

Parameter	Description
Monitor data set name characteristics:	
MONDSN_PATTERN	Specify the DSN pattern name to be used when creating a new monitor output data set or monitor data set. Use the **&SYSDATE** and **&SYSTIME** variables to create a unique data set name for each data set, preserving previous monitor data. If you do not specify a fully-quoted data set name, the user prefix is automatically appended to the data set name. Note that if the DSNPREFX parameter is specified in the TUNSSP00 member of *hilevel*.UBBPARM, then the data set name pattern specified is appended after the specified prefix name. See “Task 2 - Specify Password and Server Space Parameters” on page 2-8. The default is &USERID.&PROFILE.&SYSDATE.&SYSTIME. Valid variables are: &USERID - the ID of the TSO user &PROFILE - the monitor profile name &SYSDATE - current date &SYSTIME - current time &DSNPRFX - the constant data set node from TUNSSP00
MONDSN_PRIM_TRACKS	Specify the primary extent of the monitor output data set in tracks. The default is 20.
MONDSN_SEC_TRACKS	Specify the secondary extent of the monitor output data set in tracks. The default is 20.
MONDSN_GENERIC	Specify the generic unit device type for the monitor output data set. The default is SYSALLDA.
MONDSN_VOLUME	Specify a specific VOLSER for the monitor output data set. This field may be left blank.
MONDSN_DATACLASS	Specify the SMS data class for the allocation of monitor data sets. This field may be left blank.
MONDSN_MGMTCLASS	Specify the SMS management class for the allocation of monitor data sets. This field may be left blank.
MONDSN_STORCLASS	Specify the SMS storage class for the allocation of monitor data sets. This field may be left blank.

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Table 3-2 TUNUDEFS parameters

Parameter	Description
General online/batch reporting defaults:	
ALLVIEWS_AUTOSCALING	Controls the Visual field in the relevant Interactive Analysis panels. • Specify **YES** (default) to expand the Visual field to its maximum size for the element with the highest delay, regardless of the percentage of that element's delay. • Specify **NO** to represent delays on a scale of 0 to 100 percent.
COLUMN_TOTALS	Specify **ON** to display column totals for all online reports. Specify **OFF** for no column totals. The default is OFF. Use the TOTALS primary command in online reports to display column totals (see “Displaying Column Totals” on page 4-16).
DELAYVIEW_DETAILS	Specify **ON** (default) to display detail data in DelayView. See “Interactive Analysis Option 2 - DelayView” on page 7-20. Specify **OFF** for no detail data.
CODEVIEW_DISPLAY_MODE	Specify the initial display mode for CodeView: **CSECT** - Displays the activity of each Csect. **MODULE** - Displays the activity of each module. **PSEUDO** - Displays the activity of each pseudo group. **4GL** - Displays the activity of Adabas, Natural, and CA-Datacom routines. See “Interactive Analysis Option 3 - CodeView” on page 7-31.
HISTOGRAM_GROUP	Specify **STMT** or a number from **2** to **64** to determine Histogram instruction grouping. The default is STMT. For registered listings, STMT will group instructions on a source statement boundary. If STMT is specified and a registered listing is not found, a 32 byte grouping size is used. See “Displaying Csect Activity Locations” on page 7-34.
Batch report default options:	
JOB1-4	Specify default job cards for submitting batch jobs. ISPF job card defaults are used if none are specified.
BATCH_SYSOUT_CLASS	Specify the default JES sysout class for batch reports. The default is *. Use the MSGCLASS specified on the job card.
BATCH_LINES_PER_PAGE	Specify the default lines per page for batch reports. The default is 66.
BATCH_REPORT_WIDTH	Specify the default report width for batch reports. The default is 132.

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Table 3-2 TUNUDEFS parameters

Parameter	Description
BATCH_REPORT_FORM	Specify the default report sysout form name for batch reports.
BATCH_REPORT_DESTID	Specify the default report sysout destination ID for batch reports.
BATCH_ANALYSIS	Specify the analysis option (**NORMAL, ALL**, **WAIT**, or **ACTIVE**) for batch reports. The default is ALL. See Table 7-1 on page 7-3.
BATCH_HISTORY	Specify **YES** (default) to generate the batch history report. Specify **NO** for no report.
TASKVIEW	Specify **YES** (default) to generate the TaskView batch report. Specify **NO** for no TaskView report.
TASKCODE	Specify **YES** to generate the Task Code Detail report. Specify **NO (default)** for no Task Code Detail report.
TASKDELAY	Specify **YES** to generate the Task Delay Detail report. Specify **NO** for no (default) Task Delay Detail report.
TRANVIEW	Specify **YES** to generate the TranView batch report. Specify **NO** (default) for no TranView report.
TRANCODE	Specify **YES** to generate the Transaction Code Detail report. Specify **NO (default)** for no Transaction Code Detail report.
TRANDELAY	Specify **YES** to generate the Transaction Delay Detail report. Specify **NO (default)** for no Transaction Delay Detail report.
DELAYVIEW	Specify **YES** (default) to generate the DelayView batch report. Specify **NO** for no DelayView report.
DELAYVIEW_DETAILS_BATCH	Specify **ON** (default) to request the detail option in the DelayView report, if DELAYVIEW=YES is specified. See “Interactive Analysis Option 2 - DelayView” on page 7-20. Specify **OFF** for no detail data.
CODEVIEW	Specify **YES** (default) to generate the CodeView batch report. Specify **NO** for no CodeView report.
CODEVIEW_MODE	Specify the display mode for CodeView reports: **CSECT** - Displays the activity of each Csect. **MODULE** - Displays the activity of each module. **PSEUDO -** Displays the activity of each pseudo group. **4GL** - Displays the activity of Adabas, Natural, and CA-Datacom routines. See “Interactive Analysis Option 3 - CodeView” on page 7-31.

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Table 3-2 TUNUDEFS parameters

Parameter	Description
DATAVIEW	Specify **YES** (default) to generate the DataView batch report. Specify **NO** for no DataView report.
DB2DETAIL	Specify **YES** (default) to generate the DB2 Code Detail report. Specify **NO** for no report.
DATAVIEW_LINKLIST	Specify **YES** to include linklist statistics in the DataView report if DATAVIEW=YES is specified. See “Interactive Analysis Option 5 - DataView” on page 7-41. Specify **NO** (default) for no linklist statistics.
MODVIEW	Specify **YES** (default) to generate the ModView batch report. Specify **NO** for no ModView report.
POOLVIEW	Specify **YES** to generate the PoolView batch report. Specify **NO** (default) for no PoolView report.
HISTOGRAM	Specify **YES** (default) to generate Histogram batch report(s) for the four Csects, if specified, on the Batch Reports panel. If HISTOGRAM_TOP5=YES is specified, histograms for the five Csects showing the greatest delay are also generated. Specify **NO** for no Histogram batch reports. Specify **ALL** to generate histograms for all Csects.
HISTOGRAM_TOP5	Specify **YES** or **NO** to include histogram reports for the five Csects with the largest delays. The default is YES. If HISTOGRAM=ALL is specified, this value is overridden.

JCL for Updating and Printing Default Values

Following are examples of the JCL for updating and printing the current default values.

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Figure 3-1 BBSAMP Member TNUXDEFS (part 1 of 2)

```
//JOBCARD JOB (ACCOUNT),'PROGRAMMER',MSGCLASS=A,CLASS=A
//*
//*-------------------------------------------------------------------*
//* CUSTOMIZING THIS JCL JOB STREAM                                   *
//*-------------------------------------------------------------------*
//*                                                                   *
//* 1) CHANGE ?HILEVEL TO THE HIGH LEVEL DATA SET QUALIFIER(S) FOR    *
//*    THE BOOLE & BABBAGE INSTALLATION LIBRARIES.                    *
//*                                                                   *
//* 2) VERIFY THAT THE SYSIN DD STATEMENT POINTS TO A VALID UBBPARM   *
//*    DATA SET.                                                      *
//*                                                                   *
//* 3) VERIFY THAT TUNDB DD STATEMENT POINTS TO THE PROPER INTUNE     *
//*    Global Information File FOR YOUR INSTALLATION.                 *
//*                                                                   *
//* 4) PAGE DOWN AND FOLLOW THE INSTRUCTIONS ON HOW TO RUN THIS       *
//*    UTILITY.                                                       *
//*                                                                   *
//*-------------------------------------------------------------------*
//*
//TUNDEFS  PROC ACTION=LIST,DEFAULTS=SYSTEM
//TUNXDEF  EXEC PGM=IKJEFT01,
//         PARM='%TUNC9000 &ACTION &DEFAULTS'
//*
//STEPLIB  DD   DISP=SHR,DSN=?HILEVEL.BBLINK
//TUNLLIB  DD   DISP=SHR,DSN=?HILEVEL.BBLINK
//SYSEXEC  DD   DISP=SHR,DSN=?HILEVEL.BBSAMP
//SYSTSIN  DD   DUMMY
//SYSTSPRT DD   SYSOUT=*
// PEND
//*
//*-------------------------------------------------------------------*
//* INSTRUCTIONS FOR RUNNING THIS UTILITY                             *
//*-------------------------------------------------------------------*
//*                                                                   *
//* AFTER YOU COMPLETE THE JCL CUSTOMIZATION OF THIS JOBSTREAM        *
//* AS DESCRIBED ABOVE, USE THE DESCRIPTIONS BELOW TO ASSIST          *
//* YOU IN UPDATING THE SYSTEM AND USER DEFAULTS.                     *
//*                                                                   *
//*-------------------------------------------------------------------*
//*                                                                   *
//* THIS UTILITY UPDATES INTUNE DEFAULTS SO THAT YOU CAN CUSTOMIZE    *
//* INTUNE FOR YOUR INSTALLATION STANDARDS.  INTUNE SUPPORTS TWO      *
//* DEFAULT TABLES.  BOTH DEFAULT TABLES RELATE TO THE INTUNE TSO     *
//* USER AND NOT TO THE STARTED TASK.                                 *
//*                                                                   *
//* THE TWO DEFAULT TABLES ARE:                                       *
//*                                                                   *
//*   1) SYSTEM - THESE ARE SETTINGS APPLICABLE TO ALL INTUNE TSO     *
//*               USERS AND ARE REFRESHED EACH TIME A USER INVOKES    *
//*               INTUNE IN ISPF.  THERE IS A SAMPLE MEMBER WITH ALL  *
//*               SUPPORTED SETTINGS, SYNTAX, AND DESCRIPTIONS IN     *
//*                  BBPARM CALLED TUNSDEFS.  COPY THIS TO YOUR SITE'S  *
//*               UBBPARM LIBRARY BEFORE ALTERING.                    *
//*                                                                   *
//*   2) USER -   THESE ARE SETTINGS USED WHEN INITIALIZING THE       *
//*               USER INFORMATION FILE FOR NEW USERS.  THERE IS A    *
//*               SAMPLE MEMBER WITH ALL SUPPORTED SETTINGS SYNTAX,   *
//*               AND DESCRIPTIONS IN BBPARM CALLED TUNUDEFS.  COPY   *
//*                  THIS TO YOUR SITE'S UBBPARM LIBRARY BEFORE           *
//*                  ALTERING.                                            *
//*                                                                   *
```

Figure 3-1 BBSAMP Member TNUXDEFS (Part 2 of 2)

```
//*                                                                   *
//* THERE ARE TWO ACTIONS SUPPORTED:                                  *
//*                                                                   *
//*   1) LIST -   WHICH PRINTS OUT THE CURRENT SETTINGS.              *
//*                                                                   *
//*   2) UPDATE - WHICH USES THE STATEMENTS READ FROM THE SYSIN DD     *
//*               STATEMENT TO UPDATE THE SETTINGS.                   *
//*                                                                   *
//* BEFORE RUNNING THIS JOB:                                          *
//*                                                                   *
//*   1) COPY THE MEMBERS TUNSDEFS AND TUNUDEFS FROM BBAPRM TO        *
//*       UBBPARM.                                                    *
//*                                                                   *
//*   2) REVIEW AND MAKE CHANGES TO THE MEMBERS.                      *
//*                                                                   *
//*   3) THIS JOB HAS TWO STEPS.  ONE FOR EACH TYPE OF DEFAULTS.      *
//*      REVIEW EACH STEP MAKING SURE THAT THE FOLLOWING ARE          *
//*      SPECIFIED CORRECTLY:                                         *
//*        - ACTION=   (MUST SPECIFY LIST OR UPDATE)                  *
//*        - DEFAULTS= (MUST SPECIFY SYSTEM OR USER)                  *
//*        - SYSIN     (DD MUST POINT TO TUNSDEFS OR TUNUDEFS)        *
//*        - TUNDB     (DD MUST POINT TO GLOBAL INFORMATION FILE)     *
//*                                                                   *
//*   4) RUN THE JOB AND REVIEW THE OUTPUT.  YOU DO NOT HAVE TO RUN   *
//*      BOTH STEPS.  THEY ARE INCLUDED HERE FOR CONVENIENCE.         *
//*                                                                   *
//* MESSAGES:                                                         *
//*                                                                   *
//*     ALL MESSAGES ISSUED BY THIS UTILITY ARE LISTED AND            *
//*     DOCUMENTED ONLINE IN THE INTUNE MESSAGE APPLICATION.          *
//*                                                                   *
//*-------------------------------------------------------------------*
//*
//TUNSDEFS EXEC TUNDEFS,
//         ACTION=UPDATE,
//         DEFAULTS=SYSTEM
//*
//SYSIN    DD   DISP=SHR,DSN=?HILEVEL.UBBPARM(TUNSDEFS)
//*
//TUNDB    DD   DISP=SHR,DSN=?HILEVEL.TUN21.GIF
//*
//TUNUDEFS EXEC TUNDEFS,
//         ACTION=UPDATE,
//         DEFAULTS=USER
//*
//SYSIN    DD   DISP=SHR,DSN=?HILEVEL.UBBPARM(TUNUDEFS)
//TUNDB    DD   DISP=SHR,DSN=?HILEVEL.TUN21.GIF
```

Viewing System and User Default Values Online

To view the system and user default values online:

1. Select Option A from the Primary Option Menu to display the Administration Option Menu (Figure 3-2).

Figure 3-2 Administration Option Menu

```
InTune ------------------- Administration Option Menu ------------------------
 OPTION  ===>

    1  Associations     - Define module/Csect functions        Userid: BAOMXY2
    2  Pseudo           - Define pseudo groups              Server ID: INTUNE
    3  Content Help     - Update content-sensitive help        Status: ACTIVE
    4  Scheduling       - Create monitor schedules            Release: 2.2.0
    5  Registration     - Shared source listing registration

    S  System Settings  - View system settings for clients
    U  User Settings    - View user settings for clients
    I  Environment      - Display InTune and environmental information

 Enter an option or press END to return to the InTune Primary Option Menu
```

2. Select Option U.

   The User Defaults panel is displayed.

   Scroll right to display the date and time when the settings were last modified. Use the **S**elect line command to display information about a specific parameter.

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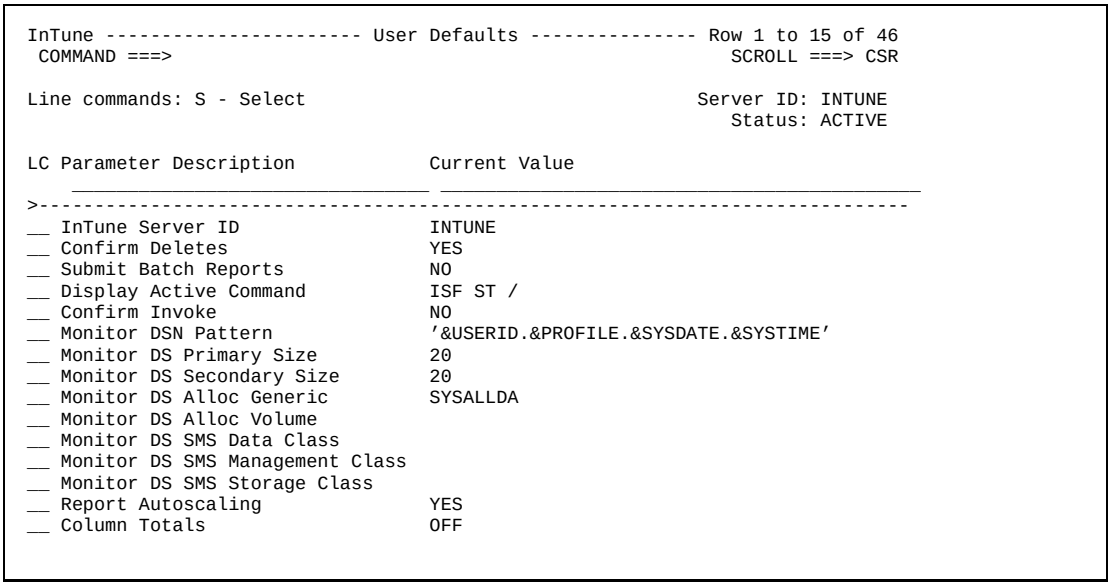
Figure 3-3 System Settings Panel



Working in the InTune Environment

This chapter shows you how to use the basic features of InTune. The following tasks are described:

Starting InTune from a TSO Session 4-2
Navigating in InTune 4-4
Using Online Help 4-6
Scrolling InTune Panels 4-11
Using PF Keys 4-11
Locating a String in a Display 4-12
Sorting the Display 4-13
Using Autonavigation. 4-14
Displaying Column Totals 4-16
Filtering the Display 4-18
Customizing the Display 4-23
Saving the Information on a Panel 4-26

When you finish reading this section, you should be able to understand and effectively use the InTune interface.

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Starting InTune from a TSO Session

To invoke InTune under TSO, you must be running ISPF.

Note

InTune requires a TSO region size of at least 4MB.

Under TSO, you can invoke InTune from MainView or from ISPF.

Starting InTune from MainView

If you have a MainView product installed, select Option T from the MainView Selection Menu.

Starting InTune from ISPF

Type the following TSO command in the ISPF COMMAND field:

TSO EXEC *'hilevel*.BBCLIB(INTUNE)'

where INTUNE is the name of the TSO REXX EXEC specified during customization.

Note

This is the TSO EXEC used to execute the CLIST created in "Task 7 - Create the REXX Startup EXECs for Invoking the InTune TSO Client" on page 2-17. Consult your InTune System Administrator for the correct name and location of the CLIST.

You can copy the start-up procedure from *hilevel*.BBCLIB to a library used by your TSO users to execute CLISTS or REXX procedures.

The first time each user invokes InTune, the User Information File Allocation panel (Figure 4-1) is displayed.

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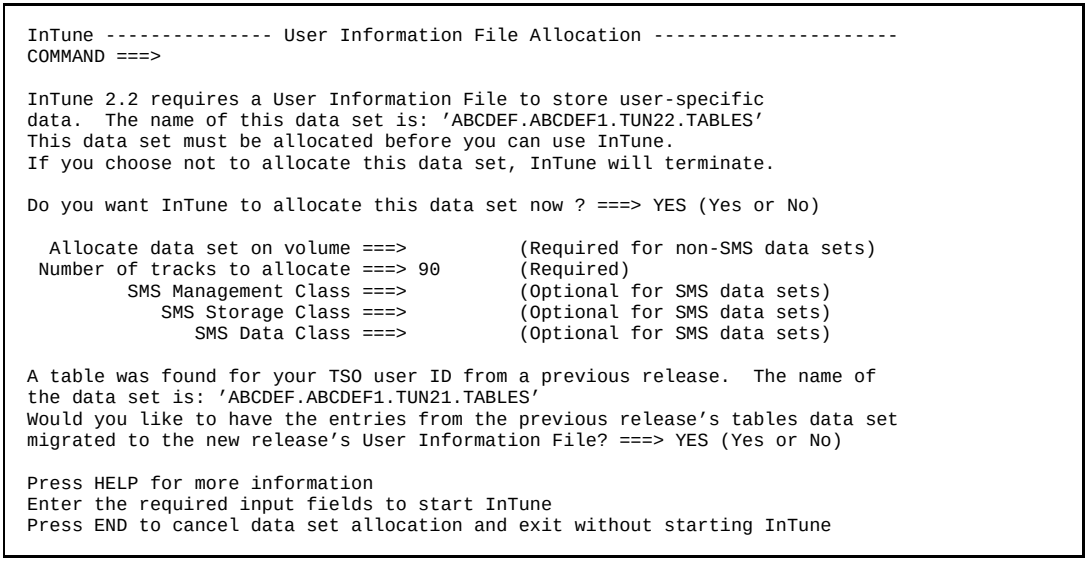
Setting Up User Options

The User Information File Allocation panel (Figure 4-1) enables you to automatically copy your existing monitor definitions from your current tables data set to the new User Information File.

This panel is not displayed if the system default DISPLAY_ALLOC_PANEL = NO is specified in the Global Tables Data Set (using *hilevel*.BBPARM member TUNSDEFS). The User Information File is allocated using the default values. Refer to Chapter , “System Default Settings” on page 4 for more information.

Figure 4-1 User Information File Allocation Panel



```
InTune --------------- User Information File Allocation ----------------------
COMMAND ===>

InTune 2.2 requires a User Information File to store user-specific
data.  The name of this data set is: 'ABCDEF.ABCDEF1.TUN22.TABLES'
This data set must be allocated before you can use InTune.
If you choose not to allocate this data set, InTune will terminate.

Do you want InTune to allocate this data set now ? ===> YES (Yes or No)

  Allocate data set on volume ===>          (Required for non-SMS data sets)
 Number of tracks to allocate ===> 90       (Required)
         SMS Management Class ===>          (Optional for SMS data sets)
            SMS Storage Class ===>          (Optional for SMS data sets)
               SMS Data Class ===>          (Optional for SMS data sets)

A table was found for your TSO user ID from a previous release.  The name of
the data set is: 'ABCDEF.ABCDEF1.TUN21.TABLES'
Would you like to have the entries from the previous release's tables data set
migrated to the new release's User Information File? ===> YES (Yes or No)

Press HELP for more information
Enter the required input fields to start InTune
Press END to cancel data set allocation and exit without starting InTune
```

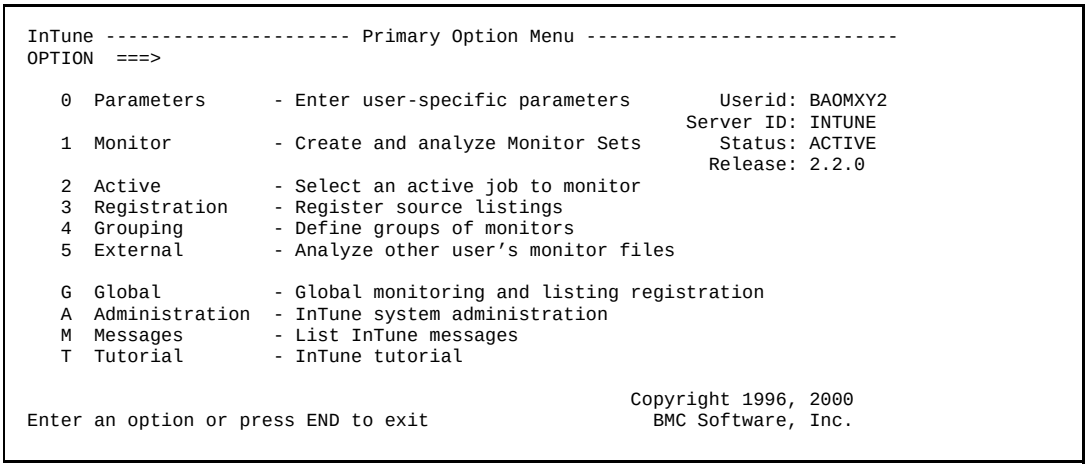
Note

If the data set is to be managed by SMS, then you can specify an * as the volume serial ID.

Navigating in InTune

After invoking InTune, the first panel you see is the Primary Option Menu (Figure 4-2). You access all InTune functions from this menu.

Figure 4-2 InTune Primary Option Menu Panel



This is a standard ISPF menu. You can type either ISPF commands or InTune options in the OPTION field.

The fields in the upper right corner of the menu display the following:

- Your User ID.
- The InTune Server Space ID and Status, which is active or inactive.
- The type of REXX library your system is using. The value is either INTERPRT, if you are using the standard REXX library or COMPILED, if you are using an alternate REXX library.
- InTune's release level.

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Table 4-1 defines the options available from the Primary Option Menu. You can specify any option at any time.

Table 4-1 InTune Primary Menu Options

Option	Description
Option 0 (Parameters)	Displays the Profile Parameters panel, which allows you to set defaults for various options of InTune. See “Setting Up InTune Profile Parameters” on page 2-48 for more information.
Option 1 (Monitor)	Displays the Monitor Definition panel, which enables you to create, invoke, and display a monitor definition. You can use one of the three analysis line commands, A, AA, or AW, to analyze the data from a particular monitor definition. See Chapter 5, “Setting Up a Monitor Definition” for more information.
Option 2 (Active)	Displays the Active Jobs panel, which allows you to create and invoke a monitor session for any active job. Refer to Chapter 6, “Invoking a Monitor” for more information.
Option 3 (Registration)	Displays the Program Listing Registration panel, which allows you to register program listings to relate program activity to actual high-level language statements. Refer to “Registering Source Program Listings” on page 9-34 for more information.
Option 4 (Grouping)	Displays the Monitor Profile Groups panel that allows you to define groups of jobsteps that can be monitored together while also specifying the jobstep that initiates (or “triggers”) the monitoring of the group. Refer to “Creating a Multi-Job Monitor: Grouping” on page 5-25 for more information.
Option 5 (External)	Displays the External Data Set List panel, which allows you to analyze monitor data sets created by other users. Refer to “Analyzing Monitor Data Sets Created by Other Users” on page 9-4.
Option G (Global)	Displays the Global Monitoring Menu panel which allows you to set up a monitor definition, invoke a monitor session or analyze data gathered during a monitor session. Refer to “Using the Global Monitoring Menu” on page 9-2 for more information.
Option A (Administration)	Displays the Administration Option Menu. From this menu, you can perform a variety of administrative functions, such as register source program listings, create Csect associations, define pseudo groups, schedule monitor requests, and update content-sensitive help. See “Performing Administrative Functions” on page 9-11 for more information. You can also view global system and user default values. See “Setting Global System and User Default Values” on page 3-2.

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Table 4-1 InTune Primary Menu Options

Option	Description
Option M (Messages)	Displays the Messages panel, which contains a list of InTune messages and their message IDs. The message text explains the message and suggests actions that you can take. Refer to “Message Help” on page 4-8 for more information.
Option T (Tutorial)	The online tutorial provides a guided tour through many of InTune’s features and functions. You move forward through the tutorial by pressing Enter and backwards by pressing PF10. The tutorial takes approximately 30 minutes to complete. If you are using InTune for the first time, BMC Software recommends that you complete the tutorial.

Displaying InTune Status

To display a current list of all active and deferred monitor requests, enter the primary command STATUS from any InTUne ISPF panel.

Using Online Help

InTune features an extensive online help facility that explains all of InTune’s panels and fields. The InTune help facility uses pop-up windows with hyperlinks to related topics. There are four types of help information:

- Screen help
- Field help
- Content-sensitive help
- Message help

Screen Help

Screen help is information relating to an InTune panel. To display screen help from anywhere in InTune, press the Help key (**PF1**).

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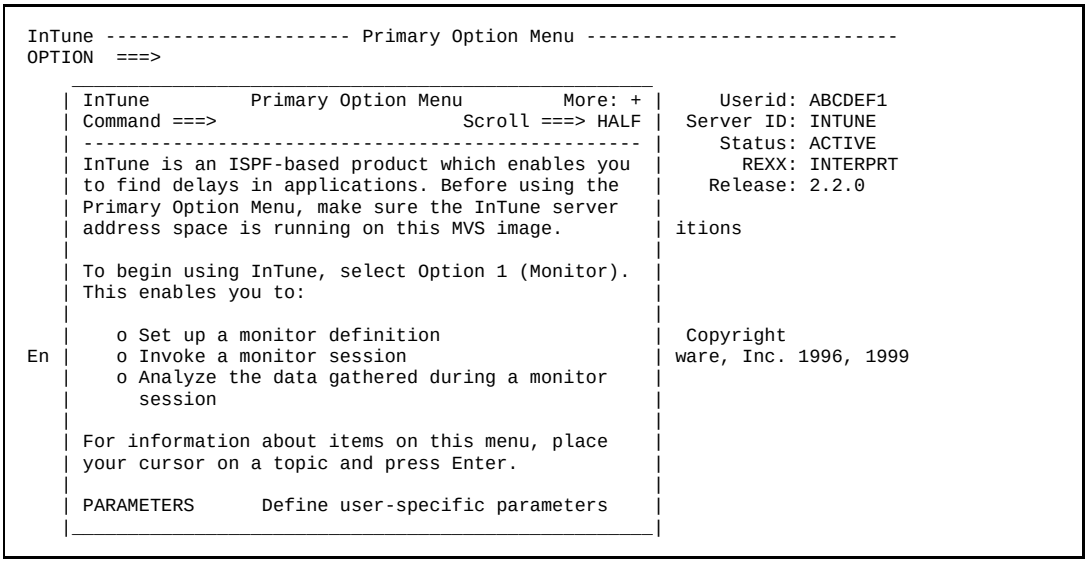
A help window overlays the InTune panel (Figure 4-3).

Figure 4-3 InTune Help Window



Hyperlinked fields are highlighted on the help display. To hyperlink to related help text:

1. Place the cursor on the highlighted field and press **Enter**.

2. Press **End** to exit the help facility and return to InTune.

3. To exit the help facility if multiple help panels are displayed, you can either press End multiple times or type QUIT in the help panel's COMMAND field and press **Enter**.

Field Help

Field help is information related to a specific field on an InTune panel. To display field help:

1. Place the cursor on the name of the field for tabular panels or in the input area of the field for data-entry panels. You may also use the tab key to position the cursor.

2. Press the Help key (**PF1**). The relevant help information is displayed.

Content-sensitive help

If the content of a field is colored red, yellow, or white, content-sensitive help is available. When you place the cursor on one of these fields and press PF1, the online help is specific to that content. See “Updating Content-Sensitive Help” on page 9-20 for more information.

Message Help

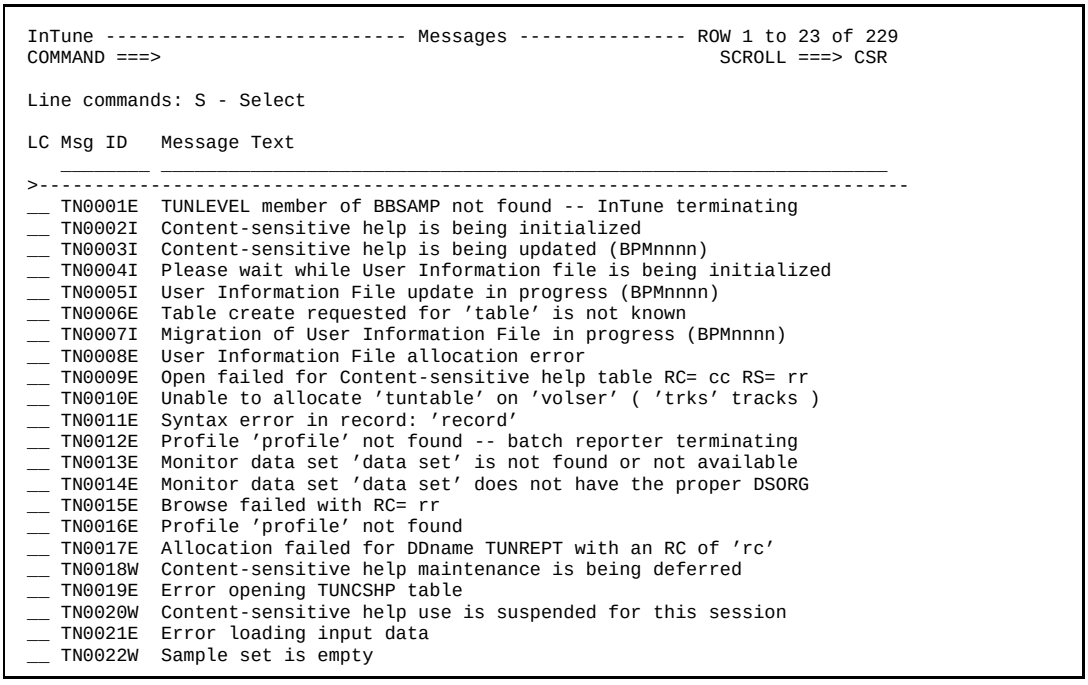
During operation, the Intune Server Space may generate a message to alert you of any problems which have occurred. You can obtain additional information about the message.

1. Record the Message ID. This is used to link to the correct information.

2. Select Option M on the Primary Option Menu.

   The Messages panel (Figure 4-4) is displayed:

Figure 4-4 Messages Panel



```
InTune --------------------------- Messages --------------- ROW 1 to 23 of 229
COMMAND ===>                                                  SCROLL ===> CSR

Line commands: S - Select

LC Msg ID   Message Text
   ________ ________________________________________________________________
>-------------------------------------------------------------------------------
__ TN0001E  TUNLEVEL member of BBSAMP not found -- InTune terminating
__ TN0002I  Content-sensitive help is being initialized
__ TN0003I  Content-sensitive help is being updated (BPMnnnn)
__ TN0004I  Please wait while User Information file is being initialized
__ TN0005I  User Information File update in progress (BPMnnnn)
__ TN0006E  Table create requested for 'table' is not known
__ TN0007I  Migration of User Information File in progress (BPMnnnn)
__ TN0008E  User Information File allocation error
__ TN0009E  Open failed for Content-sensitive help table RC= cc RS= rr
__ TN0010E  Unable to allocate 'tuntable' on 'volser' ( 'trks' tracks )
__ TN0011E  Syntax error in record: 'record'
__ TN0012E  Profile 'profile' not found -- batch reporter terminating
__ TN0013E  Monitor data set 'data set' is not found or not available
__ TN0014E  Monitor data set 'data set' does not have the proper DSORG
__ TN0015E  Browse failed with RC= rr
__ TN0016E  Profile 'profile' not found
__ TN0017E  Allocation failed for DDname TUNREPT with an RC of 'rc'
__ TN0018W  Content-sensitive help maintenance is being deferred
__ TN0019E  Error opening TUNCSHP table
__ TN0020W  Content-sensitive help use is suspended for this session
__ TN0021E  Error loading input data
__ TN0022W  Sample set is empty
```

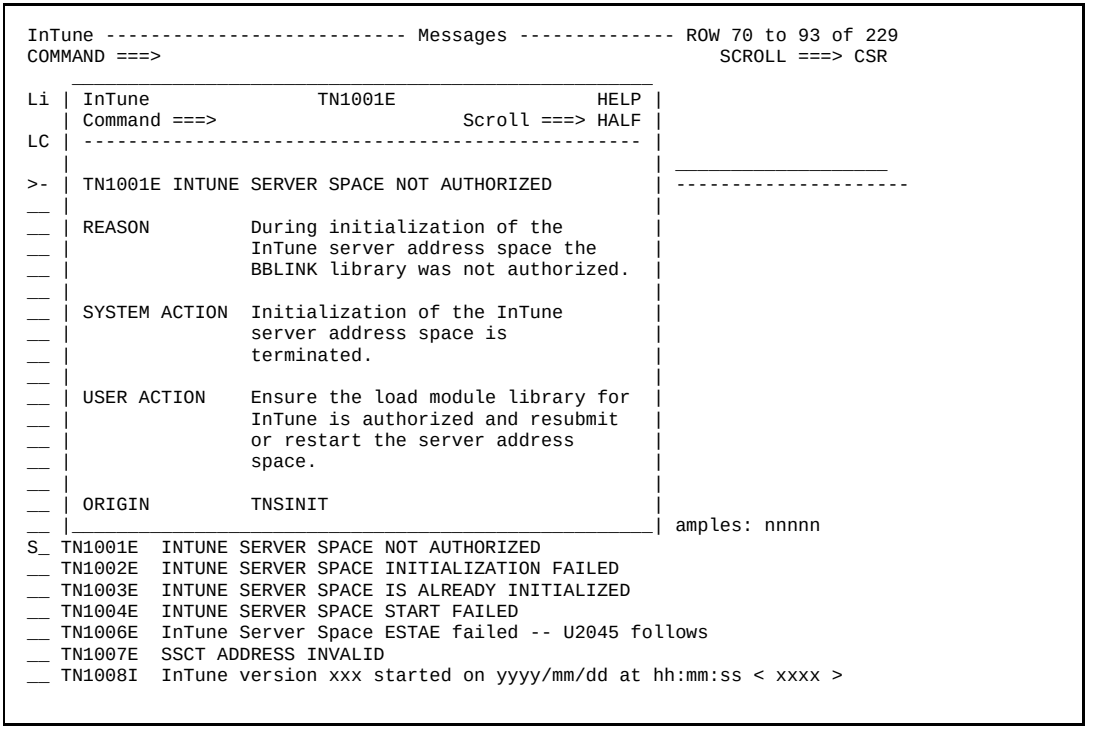
3. Use the LOCATE primary command to find a specific message ID.

4. You can also place a filter on the Msg ID or Message Text fields to find a message.

5. Type S in the LC field of the desired message and press **Enter**.

   A help window is displayed for the message (Figure 4-5). This window will include an explanation of the message, as well as suggested actions to take.

Figure 4-5 Message Help Panel



The information displayed in the Message Help window includes the following:

- **Reason** - A detailed description of the message, including why the message was issued.
- **System Action** - An explanation of what action is taken by InTune when the message is issued.
- **User Action** - The required or suggested steps to take.
- **Origin** - The InTune module which generated the message.

6. Press **End** to exit the help facility and return to InTune.

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Scrolling InTune Panels

To scroll the contents of an InTune panel, use the standard ISPF scroll commands: UP (**PF7**), DOWN (**PF8**), LEFT (**PF10**), and RIGHT (**PF11**). When you scroll right, InTune's fixed fields remain at the left margin. If more fields are available, the InTune panel displays an arrow on the far left between the column header and the data rows. The arrow indicates which direction you can scroll to see more fields:

> Indicates that more fields are available by scrolling right.

< Indicates that more fields are available by scrolling left.

<> Indicates that more fields are available by scrolling left or right.

Using PF Keys

Because InTune is an ISPF application, the definitions you set for your InTune PF keys are completely independent from other applications. To set your PF keys for use with InTune:

1. From any InTune panel, type KEYS.

2. Press **Enter**.

   The PF Key Definitions and Labels panel (Figure 4-6) is displayed:

Figure 4-6 PF Key Definition Panel

```
 PF Key Definitions and Labels - Primary Keys
Command ===>
                                                                More:     +
Number of PF Keys  . . 24                          Terminal type  . . 3278

PF1 . . . HELP
PF2 . . . SPLIT
PF3 . . . END
PF4 . . . RETURN
PF5 . . . RFIND
PF6 . . . RCHANGE
PF7 . . . UP
PF8 . . . DOWN
PF9 . . . SWAP
PF10  . . LEFT
PF11  . . RIGHT
PF12  . . RETRIEVE

PF1  Label  . .           PF2  Label  . .           PF3  Label  . .
PF4  Label  . .           PF5  Label  . .           PF6  Label  . .
PF7  Label  . .           PF8  Label  . .           PF9  Label  . .
PF10 Label  . .           PF11 Label  . .           PF12 Label  . .

Press ENTER key to display alternate keys.  Enter END command to exit.
```

3. Define your PF keys.

4. Press **End**.

Locating a String in a Display

To locate a particular string and move it to the top of a display, type in the command field

L *target*

where ***target*** is a jobname, module, or other type of information in the leftmost field.

Note

If you change the sort value of a panel, target is the field by which the panel is sorted.

The Locate command supports wildcard characters (*, %, ?). If the target you specify does not appear, the message LOCATE ARG NOT FOUND appears in the upper right corner.

Note

Some panels do not support the Locate command. Issuing Locate from these panels produces the message INVALID OPTION in the upper right corner.

Sorting the Display

You can sort the information displayed on a panel by any field using the SORT primary command. With the SORT command, you have the power to display the most over- or under-utilized resources at a glance. To sort a display:

1. In the COMMAND field, type SORT A to sort in ascending order or SORT D to sort in descending order. The default is A.

2. Place the cursor on the field you want to sort.

3. Press **Enter**.

Note

You can sort only one field per panel. If you type the SORT command for a second field, the first sort criterion is replaced.

4. To remove sort criteria from a panel, type NOSORT in the COMMAND field and press Enter. InTune returns to its initial sort order.

You can also add or remove sort criteria using the Screen Customization panel. See “Customizing the Display” on page 4-23 for more information.

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Using Autonavigation

The DelayView, CodeView, and DataView panels feature Autonavigation. This allows you to go directly to the next most logical panel, based on a selected content. To use Autonavigation:

1. Place the cursor anywhere in the line containing the information for which you want more detail.

2. Press **Enter**.

   A panel is displayed based on the type of information you selected.

Example

Place the cursor anywhere on the **Data Delay - IO Queued** line in the DelayView panel (Figure 4-7).

Figure 4-7 Autonavigation in the DelayView Panel

```
InTune --------------------------- DelayView ----------------- ROW 1 to 7 of 7
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: DETail on/off           Module: *          Profile: TUNIVP1
                  ADDHelp                  Csect: *          Options: NORMAL
                                          Offset: *           Detail: ON
   Line commands: A - Address
                  S - Distribution

LC Major category       Minor category       Actv% Wait% Totl% Visual
   ____________________ ____________________ _____ _____ _____ __________
-------------------------------------------------------------------------------
__ Program Active       Program Active       72.70  0.00 72.70 ==========>
__ Data Delay           IO Queued             0.00 18.77 18.77 =>
__ Voluntary Wait       Wait/Waitr SVC        0.27  3.91  4.17
__ File Mgmt Delay      Eov SVC               0.36  2.22  2.57
__ Data Delay           Excpvr SVC            1.46  0.00  1.46
__ DASD Mgmt Delay      Data Facility/SMS     0.18  0.00  0.18
__ Other Delays         Unknown wait type     0.00  0.13  0.13
```

When you press **Enter**, the DataView panel is displayed (Figure 4-8):

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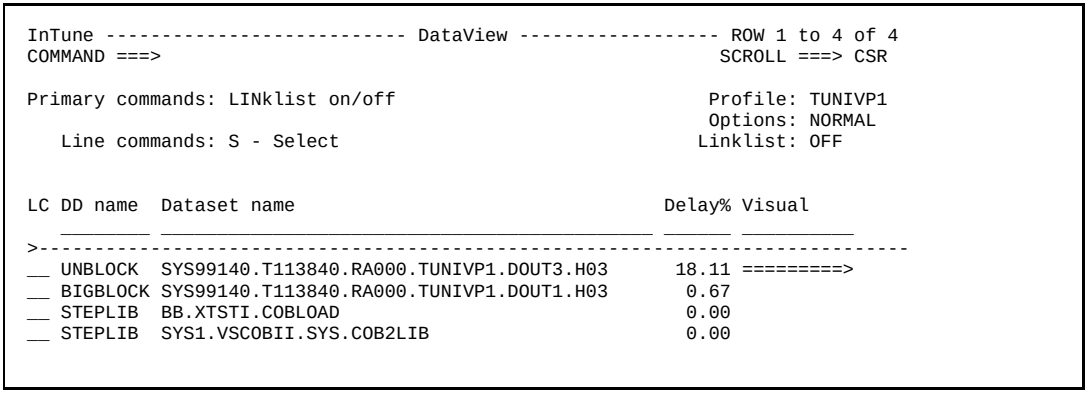
Figure 4-8 DataView Panel



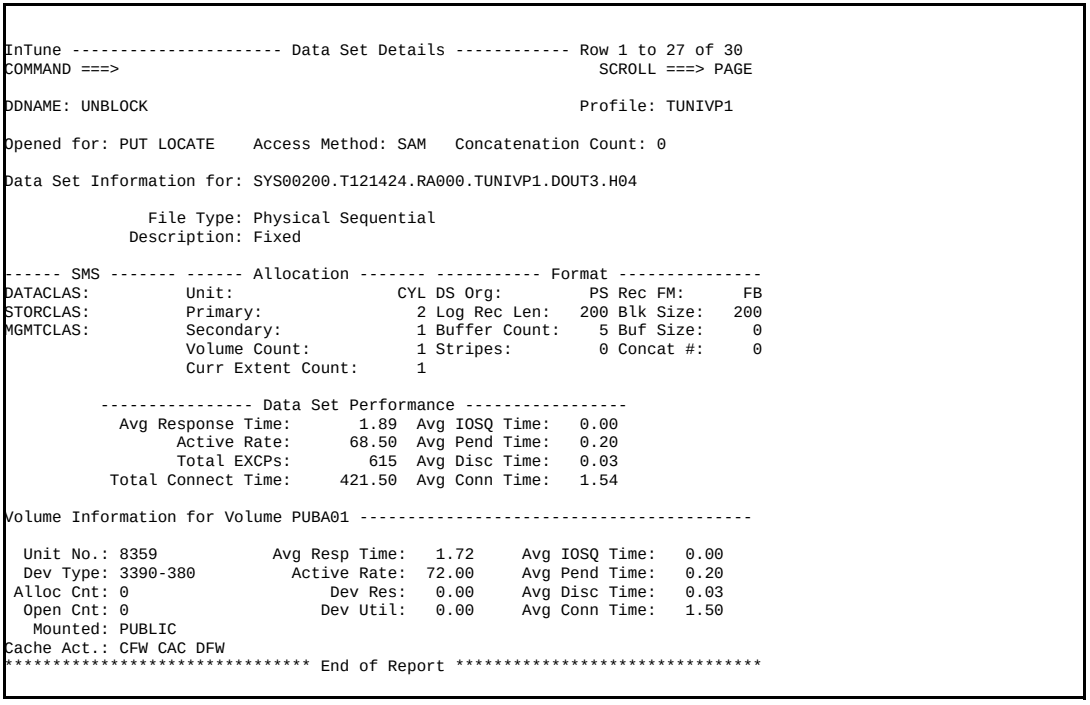
```
InTune --------------------------- DataView ------------------ ROW 1 to 4 of 4
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: LINklist on/off                              Profile: TUNIVP1
                                                               Options: NORMAL
   Line commands: S - Select                                  Linklist: OFF


LC DD name  Dataset name                                    Delay% Visual
   ________ ____________________________________________ ______ __________
>-------------------------------------------------------------------------------
__ UNBLOCK  SYS99140.T113840.RA000.TUNIVP1.DOUT3.H03      18.11 =========>
__ BIGBLOCK SYS99140.T113840.RA000.TUNIVP1.DOUT1.H03       0.67
__ STEPLIB  BB.XTSTI.COBLOAD                               0.00
__ STEPLIB  SYS1.VSCOBII.SYS.COB2LIB                       0.00
```

If you place the cursor anywhere on the UNBLOCK line and press Enter, the Dataset Details panel (Figure 4-9) for UNBLOCK is displayed.

Figure 4-9 Dataset Details Panel for UNBLOCK



```
InTune ---------------------- Data Set Details ------------ Row 1 to 27 of 30
COMMAND ===>                                                 SCROLL ===> PAGE

DDNAME: UNBLOCK                                            Profile: TUNIVP1

Opened for: PUT LOCATE    Access Method: SAM   Concatenation Count: 0

Data Set Information for: SYS00200.T121424.RA000.TUNIVP1.DOUT3.H04

              File Type: Physical Sequential
            Description: Fixed

------ SMS ------- ------ Allocation ------- ----------- Format ---------------
DATACLAS:          Unit:                CYL DS Org:         PS Rec FM:      FB
STORCLAS:          Primary:               2 Log Rec Len:   200 Blk Size:   200
MGMTCLAS:          Secondary:             1 Buffer Count:    5 Buf Size:     0
                   Volume Count:          1 Stripes:         0 Concat #:     0
                   Curr Extent Count:     1

          ---------------- Data Set Performance -----------------
            Avg Response Time:       1.89  Avg IOSQ Time:   0.00
                  Active Rate:      68.50  Avg Pend Time:   0.20
                  Total EXCPs:        615  Avg Disc Time:   0.03
           Total Connect Time:     421.50  Avg Conn Time:   1.54

Volume Information for Volume PUBA01 ----------------------------------------

  Unit No.: 8359           Avg Resp Time:   1.72     Avg IOSQ Time:   0.00
  Dev Type: 3390-380         Active Rate:  72.00     Avg Pend Time:   0.20
 Alloc Cnt: 0                    Dev Res:   0.00     Avg Disc Time:   0.03
  Open Cnt: 0                   Dev Util:   0.00     Avg Conn Time:   1.50
   Mounted: PUBLIC
Cache Act.: CFW CAC DFW
****************************** End of Report ******************************
```

When you press **End**, you return to the previous panel.

Displaying Column Totals

You can display numeric totals and subtotals for any tabular panel. Column totals are the sum of all lines in the table, not just the lines displayed on the screen. Column subtotals are displayed when a panel is filtered. Column totals are fixed and remain on the screen when you scroll through the data.

Note

Column totals can be set to display by default. Refer to Chapter , “”.

To display column totals:

1. Type TOTals in the COMMAND field. The numeric totals for the panel will appear at the bottom of the panel (Figure 4-10).

Figure 4-10 TaskView Panel with Column Totals

```
InTune --------------------------- TaskView ------------------ ROW 1 to 5 o
COMMAND ===>                                                 SCROLL ===> CSR

Primary commands: SELect, RECall, ADDHelp                     Profile: D241C
                                                              Options: NORMA
   Line commands: T - Tag    C - Code Details
                  U - Untag  D - Delay Details

LC Program  T Actv% Data% System% VolWait% InvWait% Other% Total% Visual
   ________ _ _____ _____ _______ ________ ________ ______ ______ __________
-------------------------------------------------------------------------------
__ ISTINM01    1.42  0.00    0.00     0.00     5.56   0.00   6.98 =========>
__ ISTFSNST    0.00  0.00    0.00     0.00     6.69   0.00   6.69 ========>
__ ISTFSNST    0.00  0.00    0.00     0.00     6.51   0.00   6.51 ========>
__ ISTCSCSD    0.00  0.00    0.00     0.00     6.42   0.00   6.42 ========>
__ ISTINMLS    0.00  0.00    0.00     0.00     6.42   0.00   6.42 ========>
__ ISTMTINV    0.00  0.00    0.00     0.00     6.38   0.00   6.38 ========>
__ ISTINCAV    0.00  0.00    0.00     6.30     0.00   0.00   6.30 ========>
__ ISTPUCX0    0.00  0.00    0.00     0.00     6.26   0.00   6.26 =======>
__ ISTCSCEX    0.00  0.00    0.00     0.00     6.18   0.00   6.18 =======>
__ ISTSDCLM    0.00  0.00    0.00     0.00     6.10   0.00   6.10 =======>
__ ISTIECHS    0.00  0.00    0.00     0.00     6.07   0.00   6.07 =======>
__ ISTENQIO    0.00  0.00    0.00     0.00     6.01   0.00   6.01 =======>
__ ISTENQIO    0.00  0.00    0.00     0.00     5.97   0.00   5.97 =======>
__ ISTATM00    0.00  0.00    0.00     5.93     0.00   0.00   5.93 =======>
__ ISTINCDP    0.00  0.00    0.00     0.00     5.93   0.00   5.93 =======>
__ ISTPDCLU    0.02  0.00    0.00     5.85     0.00   0.00   5.87 =======>
******************************** End of Table ********************************

---------------------------------- Totals -------------------------------------

               1.44  0.00    0.00    18.08    80.48   0.00 100.00
```

2. If you specify a filter for a field, the subtotals, which are the totals for the filtered data only, are displayed above the totals for all of the data (Figure 4-11).

Figure 4-11 TaskView Panel with Column Subtotals

```
InTune --------------------------- TaskView ------------------ ROW 1 to 5 o
COMMAND ===>                                                 SCROLL ===> CSR

Primary commands: SELect, RECall, ADDHelp                     Profile: D241C
                                                              Options: NORMA
   Line commands: T - Tag    C - Code Details
                  U - Untag  D - Delay Details

LC Program  T Actv% Data% System% VolWait% InvWait% Other% Total% Visual
   ISTI____ _ _____ _____ _______ ________ ________ ______ ______ __________
-------------------------------------------------------------------------------
__ ISTINM01    1.42  0.00    0.00     0.00     5.56   0.00   6.98 =========>
__ ISTINMLS    0.00  0.00    0.00     0.00     6.42   0.00   6.42 ========>
__ ISTINCAV    0.00  0.00    0.00     6.30     0.00   0.00   6.30 ========>
__ ISTIECHS    0.00  0.00    0.00     0.00     6.07   0.00   6.07 =======>
__ ISTINCDP    0.00  0.00    0.00     0.00     5.93   0.00   5.93 =======>
******************************** End of Table ********************************


---------------------------- Subtotals and Totals -----------------------------
               1.42  0.00    0.00     6.30    23.97   0.00  31.69
               1.44  0.00    0.00    18.08    80.48   0.00 100.00
```

3. To remove the totals from the display, type TOTals again.

Filtering the Display

InTune allows you to filter the information in a panel. By placing a filter on a field, you can restrict the displayed data to the particular data you are interested in. To add a filter:

1. Choose a field with underscores beneath its title.
2. Tab to the underscores.
3. Type an operand and the filter criteria.
4. Press **Enter**.

The display only contains data matching the filter criteria.

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Rules for Setting Filters

Use any of the following operands to filter information in an InTune panel:

Operand	Description
>	Greater than
<	Less than
=	Equals; the default
¬	Not equal to
¢	Not equal to
~	Not equal to
>=	Greater than or equal to
<=	Less than or equal to

Valid wildcard characters are asterisk (*), percentage (%), and question mark (?).

Asterisk: Use an asterisk at the beginning, middle, or end of a string to indicate the minimum acceptable string.

Example

*XYZ displays anything that ends with the characters XYZ, regardless of what the string begins with. ABC*XYZ displays anything that begins with ABC and ends with XYZ, regardless of how many characters are in between.

Percent: Use a % sign to indicate that the position must be occupied by a number.

Example

The filter criterion BAB%% displays all instances of BAB followed by two numbers. BAB30 and BAB42 satisfy the condition, but BAB173 and BAB2A do not.

Question mark: Use a question mark to indicate that a given position must be occupied by any character, regardless of its type.

Example

The filter JOB?A% displays all jobs that have JOB in the first three positions, any character in the fourth, an A in the fifth, and a number in the last position. JOB1A6 and JOB#A7 are displayed, but JOB1Z is not.

Note

If you use a wildcard within a numeric value, that number is treated as a character string. For example, you can use the filter ??9 to filter a field to show only three-digit numeric values that end with the number 9.

If more than one filter is established for a panel, both conditions must be satisfied for the data to appear. If you want to use a filter that is wider than a column, you must use screen customization. See “Customizing the Display” on page 4-23 for more information.

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Filter Example

The Active Jobs panel is shown in Figure 4-12 without any filters in place. All jobs running on SYSC and SYSD are shown

Figure 4-12 Unfiltered Active Jobs Panel

```
InTune -------------------------- Active Jobs ------------- ROW 1 to 20 of 282
COMMAND ===>                                                  SCROLL ===> CSR

Primary commands: STAtus                                   Server ID: INTUNE
                                                              Status: ACTIVE
   Line commands: M - Display Monitoring Criteria
                  I - Invoke Monitor  S - Display Active Select Command

                              Sysplex        A/S  Cur Dsp      CPU   EXCP
LC Jobname  Stepname Procstep SysName  ASID  Type Pos Pri REAL Rate  Rate
   ________ ________ ________ ________ _____ ____ ___ ___ ____ _____ _____
>-------------------------------------------------------------------------------
__ *MASTER*                  SYSC         1 STC  NS  255  629  0.16
__ *MASTER*                  SYSD         1 STC  NS  255  412  0.71
__ PCAUTH   PCAUTH           SYSC         2 STC  NS  245   43
__ PCAUTH   PCAUTH           SYSD         2 STC  NS  249   42
__ RASP     RASP             SYSC         3 STC  NS  255   86
__ RASP     RASP             SYSD         3 STC  NS  255   84
__ TRACE    TRACE            SYSC         4 STC  NS  245   46
__ TRACE    TRACE            SYSD         4 STC  NS  249   45
__ DUMPSRV  DUMPSRV  DUMPSRV  SYSC         5 STC  NS  255 2775
__ DUMPSRV  DUMPSRV  DUMPSRV  SYSD         5 STC  NS  255 1777
__ XCFAS    XCFAS    IEFPROC  SYSC         6 STC  NS  255 2566  3.22 15.25
__ XCFAS    XCFAS    IEFPROC  SYSD         6 STC  NS  255 2278  1.59  2.84
__ GRS      GRS              SYSC         7 STC  NS  253  736  0.10
__ GRS      GRS              SYSD         7 STC  NS  253  743  0.07
__ SMXC     SMXC             SYSC         8 STC  NS  255   38  0.00
__ SMXC     SMXC             SYSD         8 STC  NS  255   28  0.04
__ SYSBMAS  SYSBMAS          SYSC         9 STC  NS  245 1123
__ SYSBMAS  SYSBMAS          SYSD         9 STC  NS  249   33
__ SMSVSAM  SMSVSAM  IEFPROC  SYSC        10 STC  NS  255 1501  0.02
__ CONSOLE  CONSOLE          SYSD        10 STC  NS  255  346  0.68
```

By placing >2 in the CPU Rate filter field, the display is limited to active jobs with a CPU Rate of over 2 percent, as shown in Figure 4-13.

Figure 4-13 Setting a Filter for the Field

```
InTune -------------------------- Active Jobs ----------------- ROW 112 of 284
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: STAtus                                     Server ID: INTUNE
                                                                Status: ACTIVE
   Line commands: M - Display Monitoring Criteria
                  I - Invoke Monitor  S - Display Active Select Command

                               Sysplex        A/S  Cur Dsp      CPU   EXCP
LC Jobname  Stepname Procstep SysName  ASID  Type Pos Pri REAL Rate  Rate
   ________ ________ ________ ________ _____ ____ ___ ___ ____ >2___ _____
>-------------------------------------------------------------------------------
__ XTSTIPAS XTSTIPAS PAS      SYSD        57 STC  NS  255 5398  2.99
__ BAODYM3  IKJIMFN          SYSC       113 TSU  IN  243  421  4.58 19.86
__ BOLMGV2  $CMR             SYSC       135 TSU  IN  247  240  3.71 58.94
__ TUN21JM  TUN21JM  TUNE     SYSD       137 STC  NS  249  391  2.07 10.84
```

By adding SYSD to the filter field for Sysplex Sysname, only the jobs running on SYSD with a CPU Rate of over 2 percent are displayed, as shown in Figure 4-14.

Figure 4-14 Setting a Filter for the CPU-TIME Field

```
InTune -------------------------- Active Jobs ----------------- ROW 112 of 284
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: STAtus                                     Server ID: INTUNE
                                                                Status: ACTIVE
   Line commands: M - Display Monitoring Criteria
                  I - Invoke Monitor  S - Display Active Select Command

                               Sysplex        A/S  Cur Dsp      CPU   EXCP
LC Jobname  Stepname Procstep SysName  ASID  Type Pos Pri REAL Rate  Rate
   ________ ________ ________ SYSD____ _____ ____ ___ ___ ____ >2___ _____
>-------------------------------------------------------------------------------
__ XTSTIPAS XTSTIPAS PAS      SYSD        57 STC  NS  255 5398  2.99
__ TUN21JM  TUN21JM  TUNE     SYSD       137 STC  NS  249  391  2.07 10.84
```

The filters established for both the CPU Rate and Sysplex Sysname fields remain visible, so that you can always see the filters currently in effect.

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Customizing the Display

You can modify the display properties for each InTune panel using the Screen Customization panel. This allows you to define how information is presented when a panel is displayed.

1. Type CUST in the COMMAND field of the panel.

2. Press **Enter**.

   The Screen Customization panel (Figure 4-15) is displayed.

3. Use Table 4-2, “Screen Customization Capabilities,” on page 4-25 to define how you want the panel to display data.

4. Press **End** to return to the panel.

   You will see the customized display; however, the customization has not been saved. The customization is saved when the panel is exited.

   Figure 4-15 shows the Screen Customization panel for the Active Jobs panel. The contents of the FIELD column are almost identical to the fields on the panel. These are the internal field names used by the SORT command.

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Figure 4-15 Screen Customization Panel

```
InTune ---------- Screen Customization for: InTune Display Active   -----------
COMMAND ===>                                                  SCROLL ===> CSR

Line commands: E - exclude  I - include  M  - move  A - after  B - before
               S or SA - sort ascending  SD - sort descending  H - field help

S  FIELD    SORT INCL/ FLD  FILTER
                EXCL  TYPE

>-------------------------------------------------------------------------------
__ LC           INCL  CHR
__ JOBNAME      INCL  CHR  ____________________________________________________
__ STEPNAME     INCL  CHR  ____________________________________________________
__ PROCSTEP     INCL  CHR  ____________________________________________________
__ SYSID        INCL  CHR  ____________________________________________________
__ ASID         INCL  NUM  ____________________________________________________
__ ASIDX        EXCL  HEX  ____________________________________________________
__ TYP          INCL  CHR  ____________________________________________________
__ POS          INCL  CHR  ____________________________________________________
__ DPPR         INCL  NUM  ____________________________________________________
__ REAL         INCL  NUM  ____________________________________________________
__ CPURATE      INCL  NUM  ____________________________________________________
__ CPUTIME      EXCL  NUM  ____________________________________________________
__ TCBTIME      EXCL  NUM  ____________________________________________________
__ SRBTIME      EXCL  NUM  ____________________________________________________
__ DCPUTIME     EXCL  NUM  ____________________________________________________
__ DTCBTIME     EXCL  NUM  ____________________________________________________
__ DSRBTIME     EXCL  NUM  ____________________________________________________
__ EXCP         EXCL  NUM  ____________________________________________________
__ DELTEXCP     EXCL  NUM  ____________________________________________________

Press ENTER and END to apply changes or CANCEL to exit with no change
```

Fixed Fields

Notice that the first two fields, LC and JOBNAME, are highlighted. This identifies those fields as fixed fields. A fixed field remains at the left margin when you scroll the panel to see additional columns so that you can relate a jobname or other type of identifying information to the data displayed.

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Fixed fields are established by InTune and may not be included, excluded, or moved. In addition, other fields may not be moved in front of a fixed field. See “Scrolling InTune Panels” on page 4-11 for more information on fixed fields.

Table 4-2 Screen Customization Capabilities

To...	Do this...
Sort the data on a panel	In the S field next to the field you wish to sort by, type SD to sort in descending order or SA to sort in ascending order. In addition: • If a sort condition already exists for a panel, an A or a D appears in the SORT field. • A panel can be sorted by only one field at a time. • To remove sort criteria from a panel, type NOSORT in the COMMAND field.
Exclude or include fields from the display	To exclude a field from view, type an E in the S field next to the field. To include a previously excluded field, type an I next to the field.
Reorder fields	Type M in the S field next to the field to be moved. Type A for after or B for before to indicate where the field should go.
Add a filter	To add a filter, type the operand and the value in the FILTER field; for example, >2, =15, =MAK*. The following wildcards are valid for the FILTER field: * Indicates any character. % Indicates any single digit. ? Indicates any single character.
Remove a filter	To remove a filter, blank out the filter in the FILTER field.
Display field help	In the S field next to a field, type H to display the help window for that field. Press End to return to the Screen Customization panel.

Resetting the Display

To delete changes made to the InTune display, type RESET in the COMMAND field and press Enter. The display reverts to the previously saved customization format. If customization changes have not been added and saved, the RESET command reverts to default parameters.

Customization changes are saved in your ISPF PROFILE in a member called TUNPROF. To restore all panels to their original configuration, delete the TUNPROF member from your ISPF profile data set.

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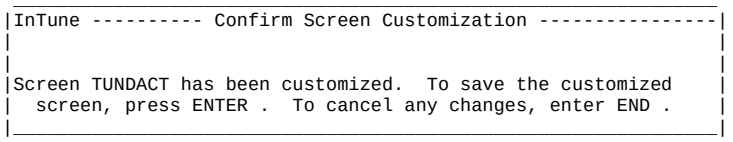
Confirm Screen Customization

Only changes made using the Screen Customization panel can be saved. Changes made by altering the filter or sort criteria directly on a panel are discarded as soon as another panel is displayed.

When you exit a panel you have customized, the Confirm Screen Customization window (Figure 4-16) is displayed:

Figure 4-16 Confirm Screen Customization Window



Your changes are saved when you press **Enter**. The next time you access InTune, the customized version of the panel is displayed. To discard your customized panel and restore the original version, press **End**.

Saving the Information on a Panel

InTune allows you to save the data displayed on any panel for later use by exporting the information to an ISPF data set. You can then include the data in another report, download the data for use in a PC spreadsheet program, or perform many other operations.

Exporting a panel

1. Display the panel you want to export; for example, CodeView.
2. Type EXPORT in the COMMAND field.
3. Press **Enter**.

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The Screen Export Information panel (Figure 4-17) is displayed:

Figure 4-17 Screen Export Information Panel

```
InTune --------- Screen Export for: CodeView                      --------------
COMMAND ===>

ISPF library:
  Project ===>
  Group   ===>
  Type    ===>
  Member  ===>                    (Blank or pattern for member selection list)

Other partitioned or sequential dataset:
      Dataset name  ===>
      Volume serial ===>          (If not cataloged)

Export options:
        Disposition ===> REPLACE  (Replace or Append)
  Edit after export ===> NO       (Yes or No)
      Output format ===> CSV      (CSV or ASIS)
               Rows ===> ALL      (All or Filtered)

Press ENTER to export screen or END to exit with no export
```

4. Type the name of the data set and member to which you want to export the panel in the ISPF library fields or Other partitioned or sequential dataset field.

5. Specify the four parameters for Export options, as described in Table 4-3.

Table 4-3 Screen Export Information Input Fields

Field Name	Value
Disposition	Specify Replace if you want to replace an existing data set. Specify Append to add the data at the bottom of the existing data set or member.
Edit after export	• Specify NO to transfer the data to the specified data set and return to the InTune panel. You may edit the data at a later time. • Specify YES to transfer to the data set and member in standard ISPF edit mode. Note that for performance reasons, InTune sets the ISPF RECOVERY parameter to OFF.
Output format	Specify ASIS if you want the format to appear as it does online. Specify CSV if you want the exported data to be in Comma Separated Value format. The CSV format is useful if you are downloading InTune data to a spreadsheet. Note that if you have set your ISPF decimal delimiter variable (ZDEC) to a value other than a decimal point (.), a semicolon (;) is used instead of a comma (,) to separate the values.
Rows	Specify ALL if you want to ignore any filters that may be in effect and export all the data. Specify Filtered to export the data as displayed on the panel.

Note

The amount of data exported is determined by the size of the data set to which you export, not by the size of your terminal display. For example, suppose you have an 80-byte terminal monitor and must scroll to the right to see all the fields on a particular panel. When you export the panel to a 121-character data set, InTune exports the full 121 characters worth of data, not just the 80 bytes currently visible. If you are planning to create a data set expressly to export InTune panels, BMC Software recommends that the data set be allocated with a logical record length of 589 characters. This will accommodate the widest InTune panel.

6. Press **End** to end the edit session and save the data or type CANCEL to quit without saving.

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Writing Data from a Table to SYSOUT

The Report primary command enables you to write the data displayed in an InTune panel to a SYSOUT data set.

1. In the COMMAND field on an InTune panel, type REPORT.

2. Press **Enter**.

   The Screen Report Information panel (Figure 4-18 on page 4-29) is displayed:

Note

If the REPORT command is not available for a particular panel, InTune issues a message

Figure 4-18 Screen Report Information Panel

```
InTune --------- Report for: CodeView                    ---------------------
COMMAND ===>

Output Information:
   SYSOUT class     ===> A
   Lines per page   ===> 60               (from 10 to 99)
   Report width     ===> 133              (from 80 to 255)
   Carriage control ===> ANSI             (ANSI or MACHINE)
   Destination ID   ===>                  (Valid JES DESTID or blank)
   Report form      ===>                  (Valid JES form name or blank)

Table Format Information:
   Include rows     ===> FILTERED (ALL or FILTERED)

User Data:
   User heading     ===>

Press ENTER to generate report or END to exit with no report
```

3. Specify each of the fields as explained in Table 4-4.

Table 4-4 Screen Report Information Input Fields

Field Name	Value
SYSOUT class	Specify the JES SYSOUT class for the printed report.
Lines per page	Specify the number of lines, including the header, to be written to a single page before a new page is initiated.
Report width	Specify the width of the report. If there are columns to the left of the panel, they are included in the report up to the width of the report.
Carriage control	Specify whether ANSI or MACHINE carriage control characters are to be used.
Destination ID	Specify the one- to eight-character nodename of the JES destination that the SYSOUT report is to be written to. In addition, you can specify a one- to eight-character user ID. If you specify a user ID, it must follow the nodename and must be separated from the nodename with a period.
Report form	Specify a one- to four-character JES form name for the destination that the report is to be written to.
Include rows	Specify ALL if you want to report on all the data, regardless of the filters in effect. Specify FILTERED to report on just the data that satisfies the filter criteria.
User heading	Specify a user title of up to 47 characters to be included as part of the report heading.

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Setting Up a Monitor Definition

This chapter describes how to create and manage monitor definitions. The following topics are discussed:

What is a Monitor Definition? 5-2
Analyzing Monitor Data. 5-3
Creating a Monitor Definition 5-3
Creating a Multi-Job Monitor: Grouping 5-25
Creating a Monitor Schedule 5-28

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What is a Monitor Definition?

A monitor definition tells InTune which program to monitor. It specifies details about the jobstep and its programs, transactions, 4GL languages, or external databases. You create a monitor definition by specifying a set of monitoring criteria. You invoke a monitor definition to collect a set of sample data for analysis.

InTune maintains monitor definitions across InTune sessions. This allows you to reuse the same monitor definition when you want to repeat a certain analysis after making changes to the program code based on a previous analysis. You can examine the impact of your changes by using this iterative approach to performance tuning. For each subsequent invocation of a monitor definition, you do not need to respecify data; this ensures that InTune uses the same monitoring criteria.

Invoking a Monitor Definition

A monitor definition becomes a monitor request from the time it is invoked until sampling is complete. The InTune Server Space tracks the monitor requests of all InTune users on the OS/390 image on which InTune is active. There may be any number of monitor requests active at the same time, depending on the value specified on the MAXREQ BBPARM parameter. See “Task 2 - Specify Password and Server Space Parameters” on page 2-8.

A monitor can be invoked in three different ways:

- Invoking a monitor definition for managed or scheduled monitoring.
- Choosing a job which is actively running for immediate results.
- From outside the TSO Client for automated operations.

Monitor requests are written to the Global Information File (GIF), which allows for persistence of the request, even if the InTune Server Space is deactivated or if the entire system is shut down. When the Server Space is started via batch job or during IPL, it reads the monitor request from the GIF and reinstates any waiting monitor requests.

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Refer to Chapter 6, “Invoking a Monitor” for more information.

You can automatically invoke a monitor when you exit the Monitoring Criteria panel. Specify YES or CONFIRM on the Profile Parameters panel.

Analyzing Monitor Data

After the monitor request terminates, you can analyze the data you collected using the Interactive Analysis Facility. Refer to Chapter 7, “Analyzing Monitor Data” for more information.

Creating a Monitor Definition

Before InTune begins monitoring a program, you must create a monitor definition describing the target program and the sampling criteria. To create a monitor definition:

1. Select Option 1, from the Primary Option Menu.

   The Monitor Definition panel is displayed (see Figure 5-1).

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Figure 5-1 Monitor Definition Panel

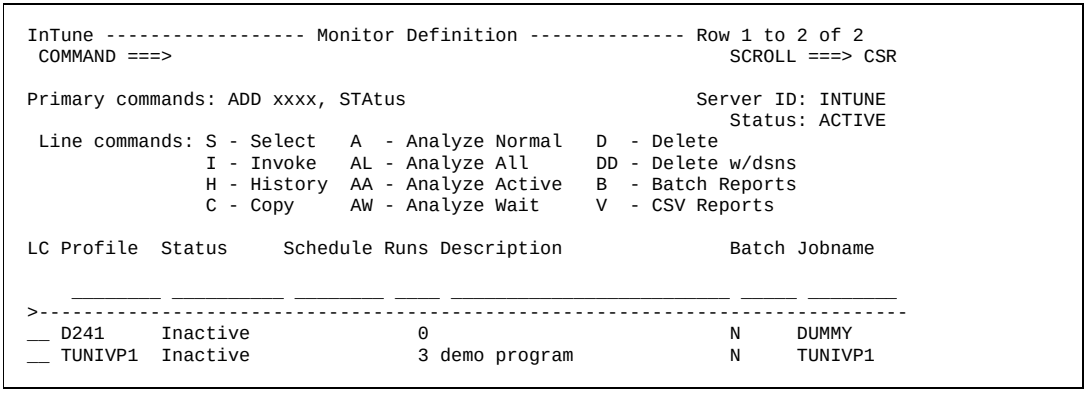

Table 5-2, “Monitor Definition Fields,” on page 5-5 describes the fields on the Monitor Definition panel. Table 5-1 lists the Monitor Definition panel’s commands.

Table 5-1 Monitor Definition Commands

For information about...	See...
ADD	“Adding a Monitor Definition” on page 5-8
STAtus	“Displaying Monitor Request Status” on page 6-4
S - Select	“Editing a Monitor Definition” on page 5-23
H - History	“Displaying Monitor History” on page 6-6
C - Copy	“Copying a Monitor Definition” on page 5-22
I - Invoke	“Invoking a Monitor from the InTune TSO Client” on page 6-2
D - Delete	“Deleting a Monitor Definition” on page 5-24
DD - Delete w/ dataset	“Deleting a Monitor Definition” on page 5-24
B - Batch Reports	“Submitting a Job to Generate Batch Reports” on page 11-2
A - Analyze	“Starting Interactive Analysis” on page 7-2
AL - Analyze All	“Starting Interactive Analysis” on page 7-2

Table 5-1 Monitor Definition Commands

For information about...	See...
AA - Analyze Active	“Starting Interactive Analysis” on page 7-2
AW - Analyze Wait	“Starting Interactive Analysis” on page 7-2
V - CSV Reports	“Creating InTune Spread Sheet Reports” on page 11-8

Table 5-2 Monitor Definition Fields

Field Name	Description
Profile	Profile name specified when you created the monitor definition. This field is also referred to as the monitor definition name.
Status	Status of the monitor request. Status is refreshed each time you press Enter. Status contains one of the following: • **Waiting** - The request has been submitted to InTune but the target is not active. InTune is waiting for an opportunity to begin sampling. • **Active** - InTune is actively sampling the indicated target. • **Inactive** - The monitor definition is available, but there is no current request to the InTune Server Space to begin sampling. • **Delete** - The request is no longer tracked by the InTune Server Space. Output data is available in the monitor data set. • **Incomplete** - The request is no longer tracked by the InTune Server Space. The output data set is not found. • **Unknown** - Communications could not be established with the InTune Server Space. The Server Space may need to be activated.
Schedule	Contains the name of an associated schedule for the monitor to run.
Runs	Number of monitor invocations since the definition was created. This is the number of data sets available in the Monitor History panel.
Description	Displays text describing the monitor definition.
Batch	Indicates if a preset series of reports are created in batch mode when the monitor completes.
Jobname	Name of the job to be monitored.
Note: Scroll right to display the following fields:	

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Table 5-2 Monitor Definition Fields

Field Name	Description
Procstep	Name of the procedure step to be monitored if the job step uses a cataloged or in-stream procedure.
Stepname	Name of the jobstep to be monitored. If no cataloged procedure is used, displays the step name on the EXEC statement that invoked the program. If a cataloged procedure is used, displays the name of the step that invoked the procedure.
Program	Name of the program on the JCL EXEC statement of the job to be monitored.
Multi-Step Monitoring	Indicates if the profile has multi-step monitoring specified.
Step Monitoring	Indicates if the profile specifies that the entire jobstep is to be monitored.
Userid	The TSO user ID of the user who last invoked the monitor definition.
Date	Date of the last monitor to be analyzed.
Time	Time of the last monitor to be analyzed.
Monitor Dataset	Data set name of the file to monitor for each profile. This will generally contain variables. See “Naming Monitor Data Sets” on page 2-56 for a complete description.
Actual Dataset	Data set name of the monitor data set with variables substituted.
TCB incl-1 to TCB incl-4	Tasks identified by these names are included in the monitor. No other tasks are monitored.
TCB excl-1 to TCB excl-4	Tasks identified by these names are excluded in the monitor. All other tasks are monitored.
Sample Interval	Number of milliseconds between samples. This number is calculated by InTune and may be adjusted during the monitoring period.
Samples	Number of samples gathered during the monitor.
Elapsed	Amount of time in seconds that the jobstep is monitored.
Strt Delay	The delay in seconds for startup of the monitor request. You may wish to specify a delay in order to skip monitoring the initialization functions within the jobstep.

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Table 5-2 Monitor Definition Fields

Field Name	Description
Monitors per job step execution	Specified on the “Job Monitoring Criteria” panel (which appears from the “All Jobs” field of the Monitoring Criteria panel). Specify successive monitoring by specifying a value equal to or greater than 1 in the field: Run up to 0 monitors per jobstep execution The number of monitoring sessions to be started for a single execution of a jobstep. When a monitor session reaches its target sample count, InTune closes the monitor data set, and continues sampling with a new monitor data set. When a monitor data set is closed, it is available for analysis. This is known as successive monitoring.
Number of job step runs to monitor	Specified on the “Job Monitoring Criteria” panel (which appears from the “All Jobs” field of the Monitoring Criteria panel). Specify recurrent monitoring by specifying a value equal to or greater than 1 in the field: Monitor this job the next 0 times it runs The number of times a monitor is to be run for a jobstep. This allows for multiple monitor runs for only one invocation.
Strt Window	Start of a time range during which the monitor request is valid. If the jobstep to be monitored ends before the start time, the monitor will not start. If the jobstep is running at the start time, sampling begins at that time.
End Window	End time of a time range during which the monitor request is valid. If the jobstep to be monitored does not start before the end time, the monitor request is cancelled.
DB exit	Name of the exit routine for monitoring either Adabas or CA-Datacom.
4GL exit	Name of the exit routine for monitoring Natural.
Target 1- Target 4	Target systems in a sysplex where a job will be monitored. Blank specifies local system only. “*” specifies all systems in the sysplex.
Trans. 1 - Trans. 4	Transaction codes to be monitored for IMS and CICS jobs only.
Term 1 - Term 4	Terminal IDs to be monitored for IMS and CICS jobs only.

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Table 5-2 Monitor Definition Fields

Field Name	Description
User 1 - User 4	User IDs to be monitored for IMS and CICS jobs only.
OLTP	Type of transaction processing system if any that was monitored for IMS and CICS jobs only.
Tasklib	Specifies the name of an alternate DDNAME from which the monitored program loads other programs. InTune requires the location of program load modules to obtain the information required to display Csect offsets during analysis.

Adding a Monitor Definition

1. In the COMMAND field, type ADD *xxxx* to add a new monitor definition.

   where *xxxx* is a one- to eight-character unique identifier for the monitor definition. The identifier is maintained as the profile name for the monitor you are adding. Profile names are displayed on the Monitor Definition panel and are sorted alphabetically.

2. Press **Enter**.

   The Monitoring Criteria panel (Figure 5-2) is displayed.

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Figure 5-2 Monitoring Criteria Panel

```
InTune ---------------------- Monitoring Criteria ----------------------------
 COMMAND ===>

Specify parameters for monitoring session:                   Profile: MARGTEST
    Description ===>
   Batch reports ===> N (Y or N)
 Monitor dataset ===> '&USERID.&PROFILE.&SYSDATE.&SYSTIME'

Specify target name: (Job required)
   Job ===>          Step ===>          Pstep ===>          Prog ===>
     Multi-Step Monitoring ===> NO  (YES or NO)
Specify target systems in SYSPLEX: (default is local system only)
System ===>                 >                  >                  >

Specify parameters for target job name:
        Monitor duration ===> 60     (Used as estimate)
      Monitor entire step ===> NO     (Yes or No)
        Number of samples ===> 6000
 DD name for load modules ===>

Tab to the environment for additional monitoring options and press
ENTER to select:   All Jobs CICS IMS ADABAS  Natural CA-Datacom

Press END to save changes; enter CANCEL to exit without saving
```

3. Specify all required information for your monitor definition. Table 5-3 on page 5-9 describes each field and identifies which are optional.

Note

Fields identified as Optional will narrow down the selection and generate fewer but more precise samples.

4. Press **End** to save your changes, or type CANCEL to exit without saving changes.

Table 5-3 describes the field in the Monitoring Criteria panel.

Table 5-3 Monitoring Criteria Fields

Field Name	Description
Specify parameters for monitoring session	
Profile	The profile name specified with the ADD *xxxx* command.
Description (Optional)	Type a 1- to 24-character description of the monitor definition. This will appear on the Monitor Definition panel.

Table 5-3 Monitoring Criteria Fields

Field Name	Description
Batch reports (Optional)	Specify Y or N to determine if InTune creates a user-defined series of reports in batch mode after the monitor completes. This setting overrides the default set on the Profile Parameters panel. See Chapter 11, “Generating InTune Batch Reports” for information about defining batch reports.
Monitor dataset	Specify the name of the data set to receive the output data from the monitor request. Each node of the monitor data set may contain either fixed text or one of the following variables: **&USERID** - TSO ID of the user who initiated the monitor request **&PREFIX** - TSO prefix or value specified in TUNCALL PREFIX keyword. **&PGMNAME** - Program name obtained at ATTACH time **&PROFILE** - Name of the monitor definition profile used to start the request **&SYSTIME** - Time that a request was initiated, in the following format: ‘T’hhmmsst **&SYSDATE** - Date that a request was initiated, in the following format: ‘D’ccyyddd **&SYSNAME** - The OS/390 system name **&JOBNAME** - The name of the job **&STEPNAME** - The name of the job step **&PROCSTEP** - The name of the procedure step **&JOBID** - The JES job identification number If the data set name is not quoted, the user prefix is appended as the first node of the name. See “Naming Monitor Data Sets” on page 2-56 for more information.
Specify target name	
Job (Required)	Type the name of the job to monitor. Use the * wildcard character to match multiple characters and the + wildcard character to match any single character.
Step (Optional)	Type the name of the step to monitor. Within a multistep job using cataloged procedures, you must specify a Step name and a Pstep name or a Program name to select the correct program. If the target of the Step name is a cataloged procedure or an instream procedure, you must further define the step you want to monitor using Pstep name.
P-step (Optional)	Type the name of the procedure step to monitor. Use this parameter only if the jobstep uses a cataloged or instream procedure.

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Table 5-3 Monitoring Criteria Fields

Field Name	Description
Program (Optional)	Type the name of the program to monitor. If you do not specify Program name, you must specify Step name, as well as Pstep name, when appropriate.
Multi-Step Monitoring	Specify YES if InTune is to monitor every jobstep that matches the criteria specified in the Step, Pstep, and Prog fields of the Monitoring Criteria panel. Specify NO if only the *first* jobstep that matches the criteria should be monitored. If you specify YES, the results will be collected into multiple data sets and each data set will have to be analyzed.
Specify target systems in SYSPLEX	
System	Type the name of the target systems in the Target systems fields. You may specify up to four system names. Each name can specify a single system or a generic name, using a wild-card indicator; for example, PR*. The default is blank, which specifies the local system only. “*” specifies all systems in the sysplex. See “Specifying Target Systems for Parallel Sysplex” on page 5-13.
Specify parameters for target job name	
Monitor duration	Specify the duration in seconds for which the sampling process is active; the default value is 60 seconds. You can also specify minutes: 10M. This value is used to set the sampling rate, based on the number of samples requested, and whether the entire job step is to be monitored.
Monitor entire step	Specify YES in this field to gather information about an entire jobstep. Specify NO to monitor until the requested number of samples is collected. BMC Software recommends that you do not use YES in this field for long-running jobs, since this causes significant delays in loading the data for interactive analysis. See “Determining Number of Samples to Collect and Total Time to Monitor” on page 5-14 for more information.

Table 5-3 Monitoring Criteria Fields

Field Name	Description
Number of samples	Specify the number of samples to take during the monitor period. The default value is 6000 samples. See “Determining Number of Samples to Collect and Total Time to Monitor” on page 5-14 for more information.
DD name for load modules (Optional)	Select additional DD name to consider for load modules. Some applications load programs from a specific DD name. InTune will search the PDSs allocated to this DD name to get module and Csect information during the monitor session.
Additional monitoring options	
ALL JOBS (Optional)	Tab to this field and press **Enter** to display a window that allows you to choose tasks to include or exclude. See “Monitoring Criteria for ALL JOBS” on page 5-15 for more information.
CICS (Optional)	Tab to this field and press **Enter** to display a window that allows you to specify transaction codes, terminal IDs, and user IDs. See “Monitoring Criteria for CICS” on page 5-17 for more information.
IMS (Optional)	Tab to this field and press **Enter** to display a window that allows you to specify IMS transaction codes, terminal IDs, and user IDs. See “Monitoring Criteria for IMS” on page 5-19 for more information.
ADABAS (Required for monitoring Adabas)	Tab to this field and press **Enter** to display a window that allows you to specify the Adabas release level. Only one online transaction processing system can be specified within a monitor definition. If you enter any information into the IMS Monitoring Criteria panel, the CICS option is made non-selectable. To deselect IMS, blank out all Transaction codes, Terminal IDs, and User IDs, and exit the panel.
Natural (Required for monitoring Natural)	Tab to this field and press **Enter** to display a window that allows you to specify the Natural release level. See “Monitoring Criteria for Natural” on page 5-20 for more information.
CA-Datacom (Required for monitoring CA-Datacom)	Tab to this field and press **Enter** to display a window that allows you to specify the CA-Datacom release level. See “Monitoring Criteria for CA-DATACOM” on page 5-21 for more information.

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Specifying Target Systems for Parallel Sysplex

InTune allows you to view an entire sysplex as a single system. If you want to monitor a job running on a specific system or one of several systems, type the name of the systems in the Target systems fields. You may specify up to four system names. Each name can specify a single system or a generic name, using a wild-card indicator; for example, PR*.

Depending on what you specify for Target systems, InTune will monitor a job as follows:

No target systems specified (blank): InTune monitors jobs running in the local system only. This is known as a local request. No target systems specified is the default.

One target system: InTune monitors a job only if it is running in the specified system. Any jobs with the same name executing on a different system are ignored. This is known as a target request.

Multiple target systems: InTune monitors the first job to execute on any of the specified systems. InTune only monitors the first job to start, and any other matching jobs are ignored.

All systems: (*) InTune monitors jobs running on all systems in the sysplex. InTune only monitors the first job to start, and any other matching jobs are ignored.

Data is sent back to the local system for recording. This is done because allocation of a data set on the target system may be precluded by shared DASD restrictions, security, or SMS DASD policies. If the local system is not available, recording takes place on the target system.

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Determining Number of Samples to Collect and Total Time to Monitor

The accuracy of InTune's analysis is determined primarily by the number of samples taken over a specified period of time. The number of samples taken is determined by the values you supply in the Total time to monitor and the Number of samples to collect fields on the Monitor Criteria panel. The sampling interval, which is how often a sample is taken, is calculated internally by InTune.

For example, if you specify 6000 samples to be taken in 60 seconds, InTune automatically calculates the sampling interval as follows:

60 seconds ÷ 6000 samples = .01 seconds

For this situation, InTune takes one sample every 10 milliseconds in the address space (if only one task is found).

Note

If you want to monitor the entire duration of a job step, specify STEP in the Monitor duration field.

InTune collects as a minimum the requested number of samples over a variable time frame. The actual number of samples taken may exceed the requested number of samples, but the number of samples considered for the reports is between the number of samples requested and no more than a maximum of 2 times the number of samples requested minus 1. This supposes that the job step ran long enough to allow InTune to capture the requested number of samples at the highest InTune sampling rate.

Under certain circumstances, you may need to take significantly more samples. However, taking more samples requires more analysis time. BMC Software recommends taking between 3000 and 10000 samples for an effective balance of accuracy and performance.Specifying Additional Monitoring Criteria

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The Monitoring Criteria panel contains fields which enable you to specify information specific to a particular environment. Navigate to the environment you plan to monitor and press **Enter** to display a window. Use the fields in the window to specify the monitoring conditions to InTune.

Monitoring Criteria for ALL JOBS

Regardless of the type of job you are monitoring, you can select ALL JOBS to display the Job Monitoring Criteria window (Figure 5-3).

Figure 5-3 Job Monitoring Criteria Window

```
InTune ---------------- Job Monitoring Criteria ----------------------
COMMAND ===>

Scheduling:
  Current schedule ===>          (enter a / for a list of schedules)

Additional monitoring criteria:
  Run up to    0 monitors per jobstep execution
  Monitor this job the next    0 times it runs
  Delay monitoring    0 seconds after step start
  Call user written 4GL exit program          for this monitor
  Call user written Data Base exit program          for this monitor

For all jobs:
  Tasks to include ===>          >          >          >
  Tasks to exclude ===>          >          >          >

Press END to save and return to Monitor Criteria or CANCEL to
discard changes.
```

Scheduling

You can limit the time period where InTune attempts to schedule a monitor session by either associating the request with a specific Schedule or specifying scheduling criteria that is specific to this monitor definition only. To use an existing schedule, either enter the name of the schedule, or enter a slash (/) to see a list of exiting Schedules. To specify unique scheduling criteria for this monitor definition, enter a plus sign (+).

For more information about schedules, refer to “Creating a Monitor Schedule” on page 5-28.

Additional Monitoring Criteria

With these fields, you can specify whether the profile has successive or recurrent monitoring associated with it. Refer to Table 5-4.

Table 5-4 Additional Monitoring Criteria

Field Name	Description
Run up to . . .	Specify here the number of monitoring sessions to be started for a single execution of a jobstep. When a monitor session reaches its target sample count, InTune closes the monitor data set, and continues sampling with a new monitor data set. When a monitor data set is closed, it is available for analysis.
Monitor this job . . .	The number of times this jobstep would be monitored. The default is 1. Specifying a larger value causes InTune to monitor each recurrent execution of this jobstep until the specified limit is reached. This is especially useful for jobs that execute in response to some external event or jobsteps that you wish to monitor every time they run. Specifying a value greater than 1 removes the need for reinvoking the monitor after the job has run the first time.
Delay monitoring . . .	The delay (specified in seconds) for the startup of the monitor session. You might want to specify a delay in order to skip monitoring the initialization functions within the jobstep.
Call user written 4GL . . .	Specify the name of a 4GL program to be called by InTune during the monitor session. 4GL Exits allow InTune to relate activity to the user-written Fourth-generation Language statements that caused the activity, instead of the default of identifying only the service routines of the 4GL Language being used.
Call user written Data Base . . .	Specify the name of a database exit to be called by InTune during the monitor session. Database Exits allow InTune to relate the database activity to the application components responsible for the activity, such as SQL statements of database calls invoked by application programs.

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Including and Excluding Tasks

A subtask is a uniquely dispatchable unit of work within OS/390. Some jobs may have active serial subtasks to perform various work for the application.

Use the Tasks to include field to restrict monitoring to specific subtasks within the address space. Specify up to four tasks to be sampled in a multitasking environment.

Use the Tasks to exclude field to omit up to four tasks from sampling in a multitasking environment. You may not want to monitor all subtasks within the address space if their functions have nothing to do with your application.

Use the * wildcard character to match multiple characters and the + wildcard character to match any single character.

After sampling is complete and you begin your analysis, use TaskView to display a list of the tasks monitored by InTune. See “Interactive Analysis Option 1 - TaskView” on page 7-15 for more information.

Note

If the Tasks to include field on the Job Monitoring Criteria panel contains an entry for DSNECP10, only one sample is collected per DIE/SRB scheduled into the region.

Monitoring Criteria for CICS

If you are monitoring a CICS job, select this field to display the CICS Monitoring Criteria panel (Figure 5-4).

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Figure 5-4 CICS Monitoring Criteria Panel

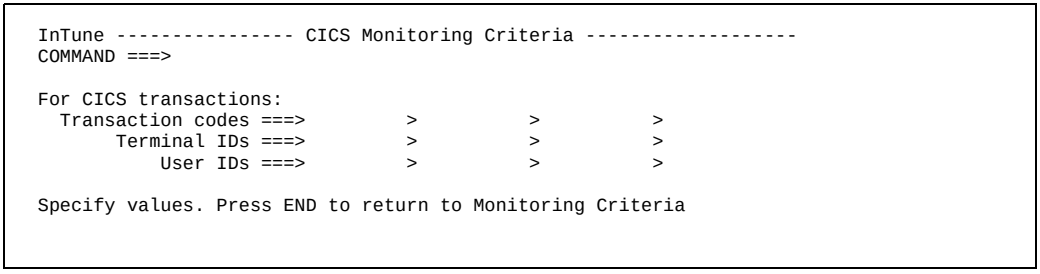


Table 5-5 on page 5-18 describes the fields in the CICS Monitoring Criteria panel.

Note

Only one online transaction processing system can be specified within a monitor definition. If you enter any information into the CICS Monitoring Criteria panel, the IMS option is made non-selectable. To deselect CICS, blank out all Transaction codes, Terminal IDs, and User IDs, and exit the panel.

Table 5-5 CICS Monitoring Criteria Fields

Field Name	Description
Transaction codes	Specify up to four CICS transaction codes to monitor. If you specify multiple transaction codes, they are ORed together. Use the * wildcard character to match multiple characters and the + wildcard character to match any single character.
Terminal IDs	Specify up to four CICS terminal IDs to monitor. If you specify multiple terminal IDs, they are ORed together. Use the * wildcard character to match multiple characters and the + wildcard character to match any single character.
User IDs	Specify up to four CICS user IDs to monitor. If you specify multiple user IDs, they are ORed together. Use the * wildcard character to match multiple characters and the + wildcard character to match any single character.
If you specify a combination of transaction codes, terminal IDs, and user IDs, all criteria must be met.	

Monitoring Criteria for IMS

If you are monitoring an IMS job, you can select this field to display the IMS Monitoring Criteria panel (Figure 5-5).

Figure 5-5 IMS Monitoring Criteria Panel

```
InTune ----------------- IMS Monitoring Criteria -----------------
COMMAND ===>

For IMS transactions:
  Transaction codes ===>          >          >          >
       Terminal IDs ===>          >          >          >
           User IDs ===>          >          >          >

Specify values. Press END to return to Monitoring Criteria
```

Table 5-6, “IMS Monitoring Criteria Fields,” on page 5-19 describes the fields in the IMS Monitoring Criteria panel.

Note

Only one online transaction processing system can be specified within a monitor definition. If you enter any information into the IMS Monitoring Criteria panel, the CICS option is made non-selectable. To deselect IMS, blank out all Transaction codes, Terminal IDs, and User IDs, and exit the panel.

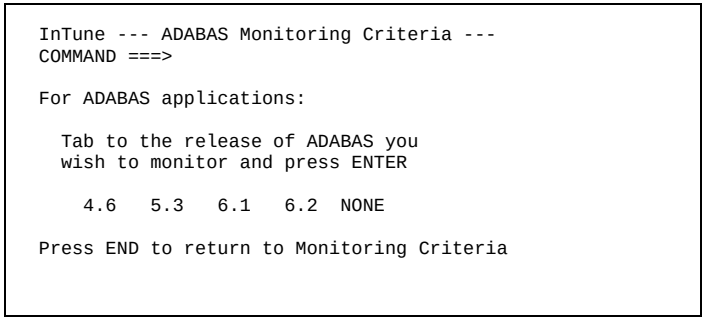
Table 5-6 IMS Monitoring Criteria Fields

Field Name	Description
Transaction codes	Specify up to four IMS transaction codes to monitor. Use the * wildcard character to match multiple characters and the + wildcard character to match any single character.
Terminal IDs	Specify up to four IMS terminal IDs to monitor. Use the * wildcard character to match multiple characters and the + wildcard character to match any single character.
User IDs	Specify up to four IMS user IDs to monitor. Use the * wildcard character to match multiple characters and the + wildcard character to match any single character.

Monitoring Criteria for Adabas

Select this field to display the Adabas Monitoring Criteria panel (Figure 5-6).

Figure 5-6 Adabas Monitoring Criteria Panel



To use this panel, navigate to the release of Adabas that is running on your system and press **Enter**. If you are not running Adabas or do not want to use it for a particular monitor definition, tab to NONE and press **Enter**. Once you have selected the correct release, press **End** to exit the panel.

Note

Only one application type can be specified within a monitor definition. If you enter any information into the Adabas Monitoring Criteria panel, the CA-Datacom option is made non-selectable. To deselect Adabas, select NONE and exit the panel.

Monitoring Criteria for Natural

Select this field to display the Natural Monitoring Criteria panel (Figure 5-7).

Note

If you are monitoring a Natural application, you must use this panel.

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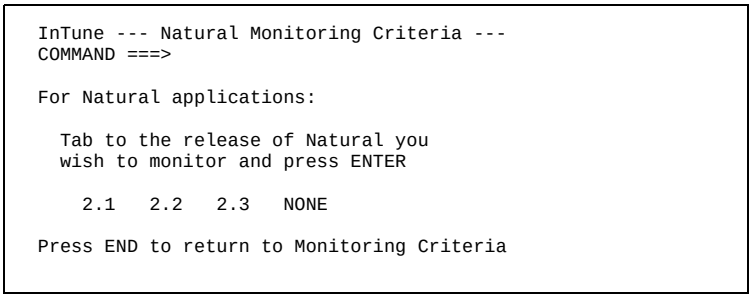
Figure 5-7 Natural Monitoring Criteria Panel

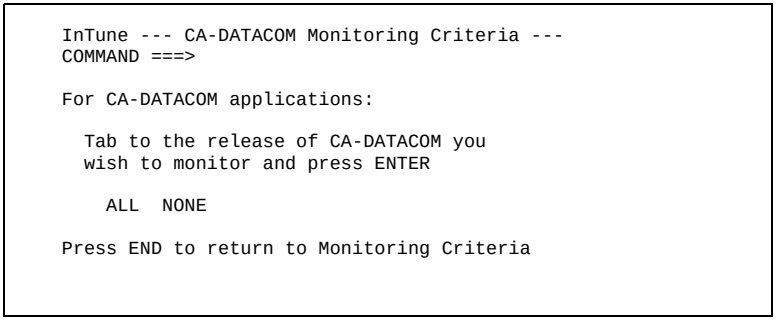


To use this panel, navigate to the release of Natural that is running on your system and press **Enter**. If you are not running Natural or do not want to use it for a particular monitor definition, tab to NONE and press **Enter**. Once you have selected the correct release, press **End** to return to the Monitor Criteria panel.

Monitoring Criteria for CA-DATACOM

Select this field to display the CA-Datacom Monitoring Criteria panel (Figure 5-8).

Figure 5-8 CA-Datacom Monitoring Criteria Panel



If you are monitoring a CA-Datacom application, navigate to ALL and press **Enter**. If you are not running CA-Datacom or do not want to use it for a particular monitor definition, tab to NONE and press **Enter**. Once you have selected All or NONE, press **End** to return to the Monitor Criteria panel.

Note

Only one application type can be specified within a monitor definition. If you enter any information into the CA-Datacom Monitoring Criteria panel, the Adabas option is made non-selectable.

Copying a Monitor Definition

The C line command is useful if you want to create multiple versions of the same monitor definition without having to retype all the monitoring criteria. For example, if you wanted to monitor individual steps of the same job, you could create one monitor definition for the first step you wish to monitor, copy each of the original steps, and change only the step names. To copy a monitor definition:

1. Type C in the LC field next to the profile you want to copy and press **Enter**.

   The Copy Profile window (Figure 5-9) is displayed.

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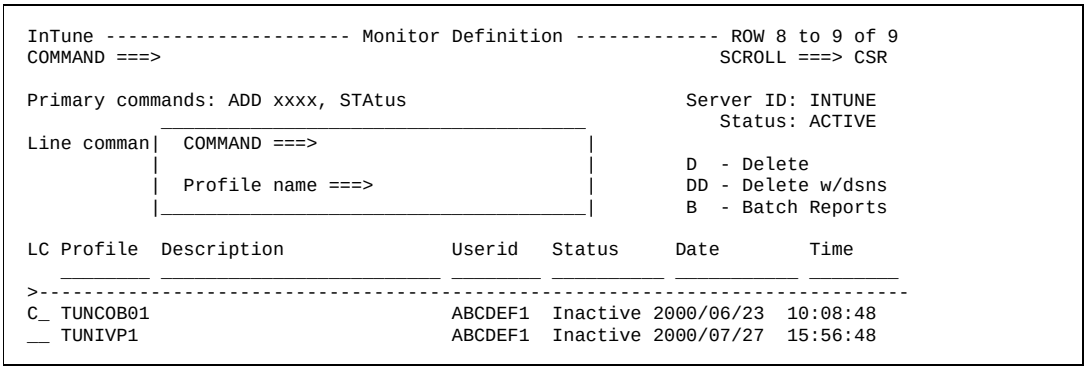
Figure 5-9 Copy Profile Window



2. Specify the name of the profile you want to use in the Profile Name field.

3. Press **Enter** to return to the Monitor Definition panel, which displays the new profile.

Editing a Monitor Definition

To edit an existing monitor definition:

1. Select the corresponding profile name on the Monitor Definition panel using the **S**elect line command on the profile to edit.

   The Monitoring Criteria panel (Figure 5-2 on page 5-9) is displayed with the current parameters listed for the selected monitor definition.

2. Type over the existing data in the fields you want to change

3. Press **End**.

Your changes are saved when you press **End** to return to the Monitor Definition panel.

Note

Type CANCEL to return to the Monitor Definition panel without saving any changes.

Deleting a Monitor Definition

When you no longer need a particular monitor definition, you can remove it by using the delete request. There are two forms of the delete request. The **D**elete line command removes the monitor definition and the monitor's history but does not delete the associated monitor data sets. The **D**elete w/**D**atasets line command deletes the data sets that may have been created by monitoring sessions under that definition and then deletes the monitor definition.

The following steps show you how to remove only the monitor definition while keeping the monitor data sets that existed for that definition.

1. Type D on the Monitor Definition panel for the definition you want to delete.

2. Depending on your profile settings, a panel may display prompting you to confirm your delete request before actually executing the operation. Confirm the delete request by typing YES or cancel the request by typing NO.

To delete the monitor definition, as well as all of its associated monitor data sets, follow the procedure described above using the DD line command.

You can reuse the same data set as many times as you want. However, InTune overwrites the data set anytime you invoke a monitor definition that points to this data set.

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Creating a Multi-Job Monitor: Grouping

If you would like to create monitors for an entire region and not just for specific jobsteps, you can create a group of monitor definitions (or profiles) that are activated by a trigger monitor. This ensures that you have the necessary data for analysis of all jobsteps in a multi-step process.

To create a group of monitors triggered by a grouping monitor:

1. Select Option 4, Grouping, from the Primary Option menu.

   The Monitor Profile Groups panel is displayed.

Figure 5-10 Monitor Profile Groups

```
InTune ------------------ Monitor Profile Groups ------------- Row 1 to 1 of 1
 COMMAND ===>                                                  SCROLL ===> CSR

Primary commands: ADD name                                  Server ID: INTUNE
                                                               Status: ACTIVE
   Line commands: S - Edit  D - Delete  U - Update Entry
                  C - Copy  I - Invoke

LC Group    Description                   Associated Schedule Modified
                                          Profiles            By:
    ________ ______________________________ __________ ________ ________
>-------------------------------------------------------------------------------
__ TEST1    demo program                              1          BAOMXY2
****************************** End of Table ******************************
```

Table 5-7 describes the commands and fields available on this panel.

Table 5-7 Monitor Profile Groups Fields

Field Name	Description
ADD	Specify a new group name (1- to 8-characters) to create a monitor group. The Group Definition panel is displayed, where you can specify a monitor schedule and a description.
S - Edit	Edit the profiles included in the group.
C- Copy	Copy the profile group, with a new group name.
D - Delete	Delete the profile group.

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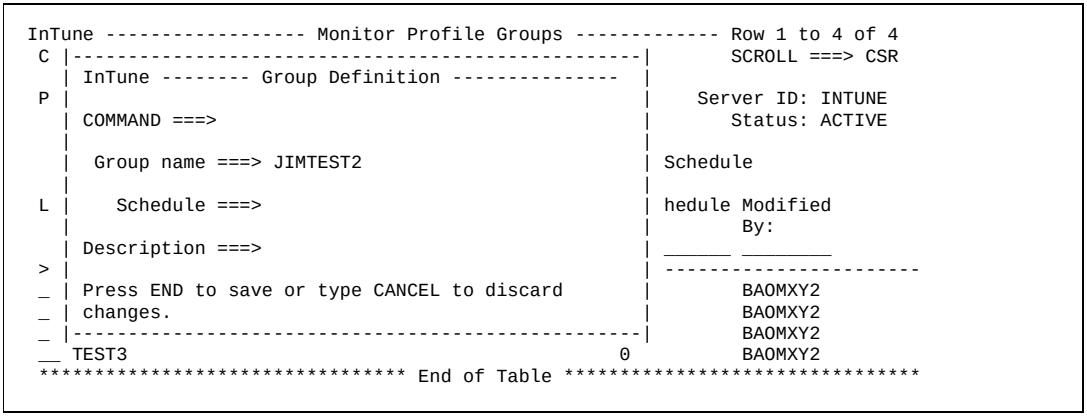
Table 5-7 Monitor Profile Groups Fields

Field Name	Description
I - Invoke	Invoke a monitoring session for the profile group. The session will begin immediately (does not use the specified schedule).
U - Update Entry	Update the schedule or description for the monitor group.
Group	The 1- to 8-character name of the group.
Description	A description of the group.
Associated Profiles	The number associated profiles.
Schedule	The name of the schedule associated with the group.
Modified By	The User ID of the person who last modified the group profile.

2. To create a trigger monitor, type ADD *xxxxxxxx* to add a new monitor definition.

   The Group Definition panel is displayed and you can specify schedule name and enter a brief description.

Figure 5-11 Group Definition Pop-Up Panel



For more information about schedules for monitors, refer to “Creating a Monitor Schedule” on page 5-28.

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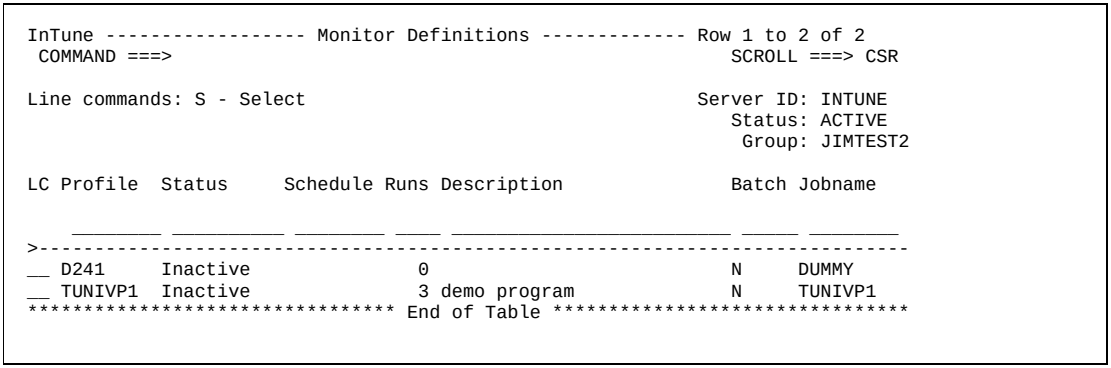
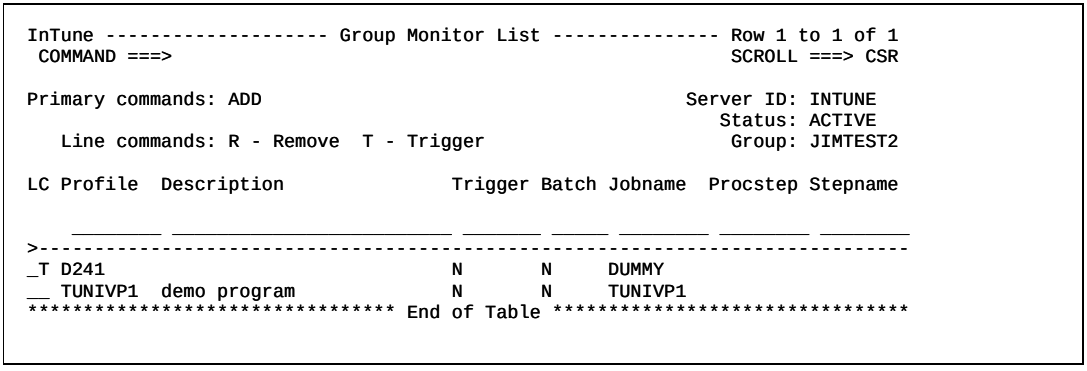
3. Enter the ADD primary command to display a list of the available monitor definitions, and use the S (select) line command to add profiles to be included in the group.

Figure 5-12 Group Monitor List Panel



4. To assign (or remove) a profile to be a trigger, use the T (trigger) line command on the Group Monitor List panel.

Figure 5-13 Group Monitor List Panel



5. The trigger profile name turns blue and the value in the Trigger field changes from N to Y.

```
InTune -------------------- Group Monitor List --------------- Row 1 to 1 of 1
 COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: ADD                                       Server ID: INTUNE
                                                               Status: ACTIVE
   Line commands: R - Remove  T - Trigger                       Group: JIMTEST2

LC Profile  Description               Trigger Batch Jobname  Procstep Stepname


    ________ ____________________________ _______ _____ ________ ________ ________
>-------------------------------------------------------------------------------
__ D241                                  Y       N     DUMMY
__ TUNIVP1  demo program                 N       N     TUNIVP1
******************************** End of Table ********************************
```

Note

To stop a multi-job monitor, issue the STAtus primary command from the Monitor Definition or Active Jobs panel. The Display Server Space Requests panel is displayed. Type P next to the waiting monitor request.

Creating a Monitor Schedule

While creating a monitor definition, you can specify monitoring by day-of-week, time and date. You can specify scheduling criteria for individual monitor definitions, or select from permanent “shift” definitions defined by the InTune administrator. For example, you might have schedules for weekend processing that can be reused every weekend.

To create a schedule for a monitor:

1. Select Option A, Administration, from the Primary Option menu.

   The Administration Option Menu panel is displayed.

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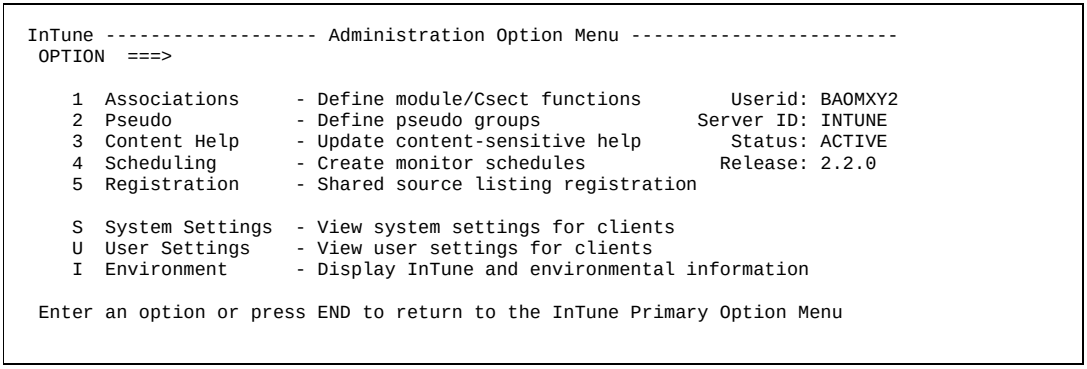
Figure 5-14 Administration Option Menu Panel



2. Select Option 4, Scheduling.

   The Monitor Schedules panel is displayed.

Figure 5-15 Monitor Schedules Panel

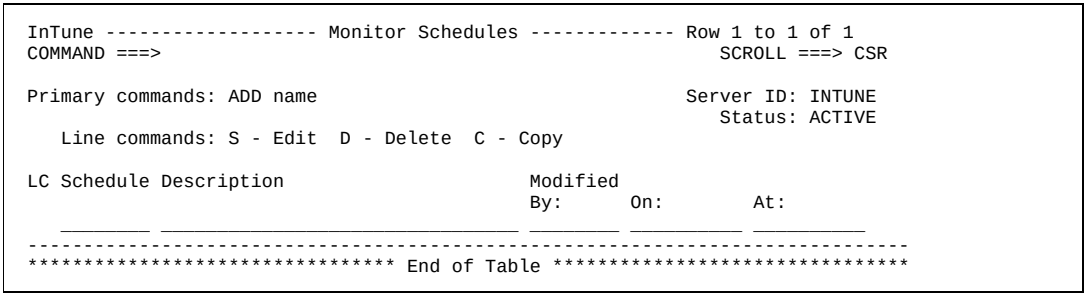


Table 5-8 describes the commands and fields available on this panel.

Table 5-8 Monitor Schedules Fields

Field Name	Description
ADD	Specify a new schedule name (1- to 8-characters). The Monitor Scheduling Criteria panel is displayed, where you can specify the days and times for a monitor to run.
S - Edit	Edit an already existing schedule.

Table 5-8 Monitor Schedules Fields

Field Name	Description
D - Delete	Delete the schedule.
C- Copy	Copy the schedule.
Schedule	The 1- to 8-character name of a schedule.
Description	The up-to 25-character optional description of the schedule.
Modified By	The user ID of the last user who edited or created the schedule.
On	The date the schedule was created or last edited.
At	The time the schedule was created or last edited.

3. To create a new schedule, use the ADD *xxxxxxxx* primary command where *xxxxxxxx* is a user-specified 1- to 8-character name of a schedule.

   The Monitoring Scheduling Criteria panel is displayed.

Figure 5-16 Monitoring Scheduling Criteria Panel

```
InTune ---------------- Monitoring Scheduling Criteria -----------------------
COMMAND ===>

                                                          Schedule: DUMMY
 Description ===>

 Date range:
  Valid dates    Starting ===> 2000/05/11 Ending ===>            (YYYY/MM/DD)
                 Monitor request valid for ===>     (days)

 Day of week settings:
  Day of week             Weekdays            Monday      Thursday   Sunday
  selection criteria      Weekends or         Tuesday     Friday
                          Specific days . .   Wednesday   Saturday

 Generic time ranges:
  Monitor valid         1 ===>      ===>      (hhmm 24 hour clock)
  during time           2 ===>      ===>
  ranges of             3 ===>      ===>
                        4 ===>      ===>

Enter END to save parameters or CANCEL to exit without change.
```

Table 5-9 describes the commands and fields available on this panel.

Table 5-9 Monitoring Scheduling Criteria Fields

Field Name	Description
Schedule	Name of the schedule.
Starting	Enter a starting date in YYYY/MM/DD format for the monitor schedule to begin.
Ending	Enter an ending date in YYYY/MM/DD format for the monitor schedule to end.
You may also use the variables: • &MONDAY • &TUESDAY • &WEDNESDAY • &THURSDAY • &FRIDAY • &SATURDAY • &SUNDAY • &TODAY • &TOMORROW instead of dates in the Starting and Ending fields. InTune will calculate these variables into the correct dates for you. When using a variable for the starting date, the current day is always used as the starting date, or the next occurance of that day. For example, if the current day is Wednesday and you specify &WEDNESDAY as the variable, then the schedule starts that day. However, if the current day is Wednesday and you specify &MONDAY as the variable, then the schedule starts the following Monday.	
Monitor Request valid for ... (days)	Specify from 1 to 999 days duration for the monitor. This field is used in conjunction with the Starting field only. When you use this field, do not use the Ending field.
Weekdays	Use a slash (/) to specify that you want the schedule to run on weekdays during the period.
Weekends	Use a slash (/) to specify that you want the schedule to run on weekends during the period.
When creating the schedule, place a slash (/) next to Weekdays and/or Weekends or, select specific days by placing a slash next to Specific days and also placing a slash next to names of the days.	
Specific days	Use a slash (/) to specify that you want the schedule to run on certain days during the period. You must select each day with a slash.
Monday - Friday	Use a slash next to each day that you want the monitor to run.
Time ranges	Specify in HHMM format up to four times during which you want the monitor to run. If no range is specified, the monitor is valid for the entire 24 hour day.

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Figure 5-17 shows an example of a filled in Monitoring Scheduling Criteria panel.

Figure 5-17 Monitoring Scheduling Criteria Panel: Example

```
InTune ---------------- Monitoring Scheduling Criteria -----------------------
COMMAND ===>

                                                          Schedule: BACKUP
 Description ===>

 Date range:
  Valid dates    Starting ===> 2000/05/11 Ending ===>            (YYYY/MM/DD)
                 Monitor request valid for ===> 20  (days)

 Day of week settings:
  Day of week             Weekdays            Monday      Thursday  /Sunday
  selection criteria      Weekends or         Tuesday    /Friday
                         /Specific days . .   Wednesday  /Saturday

 Generic time ranges:
  Monitor valid         1 ===>1200  ===>1300   (hhmm 24 hour clock)
  during time           2 ===>      ===>
  ranges of             3 ===>      ===>
                        4 ===>      ===>

Enter END to save parameters or CANCEL to exit without change.
```

When you invoke a monitor with a schedule, the monitor remains invoked until the end of the schedule. However, the monitor only starts if the target job is executed during the specified time range of the schedule. Once the end of the schedule is reached, the monitor is automatically stopped.

Note

To this panel exit without specifying a schedule, press **Cancel**. Pressing **End** associates a schedule with the monitor request.

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Invoking a Monitor

After you create the monitor definition, you can start collecting sample data about your target program. You start the sampling session by invoking a monitor definition. You may also define and invoke monitors off-line using the InTune Open Application Interface. Refer to Chapter 10, “InTune Open Application Program Interface” for more information.

For a description of the internal operation of InTune, including what happens when a monitor is invoked, see Appendix A, “How InTune Monitors an Application”.

This chapter describes the following tasks:

Invoking a Monitor from the InTune TSO Client 6-2
Invoking a Monitor for an Active Job 6-11

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Invoking a Monitor from the InTune TSO Client

1. Select Option 1 from the Primary Option Menu.

   The Monitor Definition panel (Figure 6-1) is displayed.

Figure 6-1 Monitor Definition panel

```
InTune ------------------ Monitor Definition -------------- ROW 1 to 10 of 12
COMMAND ===>                                                 SCROLL ===> CSR

Primary commands: ADD xxxx, STAtus                          Server ID: INTUNE
                                                              Status: ACTIVE
 Line commands: S - Select   A  - Analyze Normal   D  - Delete
                I - Invoke   AL - Analyze All      DD - Delete w/dsns
                H - History  AA - Analyze Active   B  - Batch Reports
                C - Copy     AW - Analyze Wait     V  - CSV Reports

LC Profile  Description               Userid   Status     Date        Time
   ________ ____________________________ ________ __________ __________ ________
>-------------------------------------------------------------------------------
__ ANTAS000                           ABCDEF1  Inactive   1998/08/27  16:59:20
__ ABCDEF1                            ABCDEF1  Inactive   1998/08/19  11:57:31
__ CONSOLE                            ABCDEF1  Inactive   1998/08/19  11:59:32
__ DB2LDBM1                           ABCDEF1  Inactive   1998/09/25  14:45:25
__ DB2LDIST                           ABCDEF1  Inactive   1998/09/25  14:48:17
__ GETMAILS                           ABCDEF1  Inactive   1998/07/20  16:12:53
__ IMSCTB                             ABCDEF1  Inactive   1998/10/13  16:34:00
__ SAMPLE                             ABCDEF1  Inactive   1998/06/22  10:20:10
__ TUNCOB01                           ABCDEF1  Inactive   1998/06/23  10:08:48
__ TUNIVP1                            ABCDEF1  Inactive   1998/08/27  15:56:48
```

Note

This is the same panel where you set up monitor definitions. Table 5-2, “Monitor Definition Fields,” on page 5-5 explains the fields displayed on the Monitor Definition panel.

2. To start a monitor using the existing monitoring criteria, type I next to the profile name of the monitor definition you want to monitor and press Enter.

3. To view or change the monitoring criteria, type S next to the profile name of the monitor definition. The Monitoring Criteria panel is displayed. Change the criteria as required. Press **End** to return to the Monitor Definition panel.

Note

If a started task you are monitoring has a jobname that is the same as another active job, you must invoke the monitor from the Active Jobs panel to ensure that the correct address space is monitored. See "Invoking a Monitor for an Active Job" on page 6-11 for information.

Invoking a Monitor Automatically

You can automatically invoke a monitor when you exit the Monitoring Criteria panel. Specify YES or CONFIRM on the Profile Parameters panel.

Monitor Request

When you invoke a monitor definition, it is called a monitor request. A monitor request is active from the time you invoke the monitor definition until one of the following occurs:

- Sampling is complete.
- The monitor request is cancelled.
- The schedule expires.

If the target is active, InTune starts collecting sample data right away. If InTune cannot find the target at the time you invoke the monitor definition, it sends a message back to your TSO session that your request was deferred, and the monitor request status on the Monitor Definition panel is shown as Waiting.

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InTune continuously monitors the jobstep initiation activity on the OS/390 system on which it is running. When InTune detects that the requested target is available, it automatically activates the sampling process. Sampling starts immediately, unless you specified a delay after step start. When InTune begins sampling a target address space, the status of the request on the Monitor Definition panel switches from Waiting to Active.

Once you invoke a monitor request, you no longer need to be connected to InTune or even logged on to TSO. However, if you remain connected to TSO/ISPF, InTune notifies you when the sampling terminates.

Refer to Appendix A, “How InTune Monitors an Application” for more information.

Monitor Persistence

Monitor requests are written to the Global Information File (GIF). This allows for persistence of the request, even if the InTune Server Space is deactivated or if the entire system is shut down. When the Server Space is started via batch job or during IPL, it reads the GIF and reinstates any active monitor requests.

Displaying Monitor Request Status

To obtain information on the progress of the sampling process associated with all monitor requests, issue the STAtus primary command on the Monitor Definition panel.

The Display Server Space Requests panel (Figure 6-2) is displayed.

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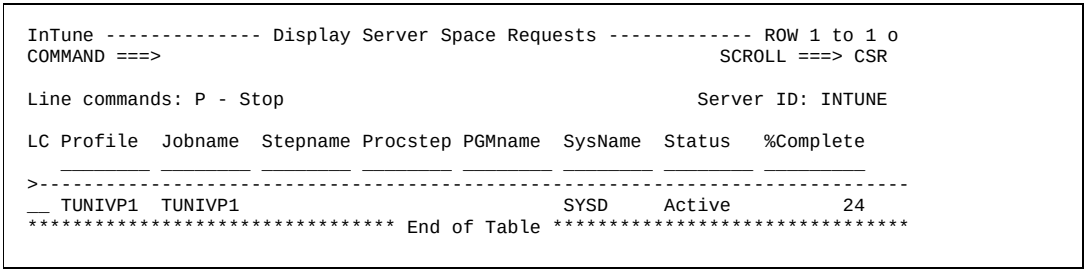
Figure 6-2 Display Server Space Requests Panel



The Display Server Space Requests panel displays the following information:

- All monitor requests currently queued or being processed by the InTune Server Space for all users.
- The status of the monitoring process.
- An estimate of the percentage of completion of a monitor request.
- The token assigned to the monitor profile. Scroll right to display this field.

The remainder of the fields on the Display Server Space Requests panel are identical to those on the Monitor Definition panel (see Table 5-2, “Monitor Definition Fields,” on page 5-5).

Press **Enter** to update the displayed information.

Note

If the target address space terminates before InTune takes the requested number of samples, the monitor request terminates. For example, when a batch job terminates before reaching the end of the range specified in the Monitor time range field.

Stopping a Monitor Request

1. From the Monitor Definition or Active Jobs panel, issue the STAtus primary command. The Display Server Space Requests panel (Figure 6-2 on page 6-5) is displayed.

2. Type P next to the monitor request you want to stop. The job status can be either active or waiting.

Note

You may only stop a monitor request that you invoked and has your User ID.

A message will be displayed indicating that the monitor has been stopped. The monitor request is removed from the display. Any data that has already been gathered is retained and is available for analysis.

Analyzing Monitor Results

To analyze the monitoring results, use one of the analysis line commands (A, AL, AA, or AW) to display the Interactive Analysis menu. Chapter 7, “Analyzing Monitor Data” describes how to analyze the data you collected.

Displaying Monitor History

The monitor history is a record of all the instances that you invoked a particular monitor profile. To see the history of a monitor profile from the Monitor Definition panel, enter line command H (History) next to the profile and press **Enter**.

The Monitor History panel (Figure 6-3) is displayed. This panel lists all data sets for the selected monitor profile.

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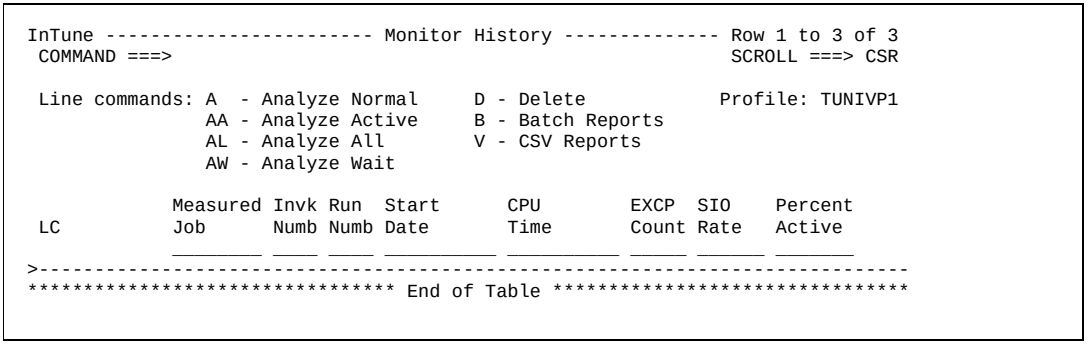
Figure 6-3 Monitor History Panel



Press **PF11** to scroll right and see more fields.

Table 6-1 lists the fields on the Monitor History panel:

Table 6-1 Monitor History Panel Fields

Field	Description
Measured Job	The name of the job being measured by InTune
Run Numb	The number of active runs for this profile
Start Date	The date this sample was collected
CPU Time	The length of time this monitor session ran in HH:MM:SS format
EXCP Count	The number of input/output operations for the job-step during the monitored period. This number includes I/O counts that are not reflected in the I/O counts at the DD name level.
SIO Rate	The number of start I/O operations per second for the job during the monitored period.
Percent Active	Percentage of the monitored period during which one or more CPUs were in use by application tasks within the address space. This number is the ratio of samples with CPU active to the total number of samples.
Percent Wait	Percentage of the monitored period during which application tasks within the address space were not using CPU. This number is the ratio of samples with CPU not active to the total number of samples.
Percent NonDisp	Percentage of samples where InTune detected the address space to be dispatchable but not dispatched. This is the ratio of samples in which the address space was dispatchable but not dispatched to the total number of samples.

Table 6-1 Monitor History Panel Fields

Field	Description
Percent ProcDelay	Percentage of the monitored period when InTune detected the address space was unable to be dispatched because a processor could not be made available. While this is occurring, the application is unable to execute.
Percent Swapped	Sample SWAPPED percentage. This number is the ratio of samples when the job was swapped out to the total number of samples.
Sample Rate	Final sampling rate, which is the number of samples per millisecond, calculated by InTune. InTune may have adjusted this rate during sampling.
Total Samples	Number of samples selected from those collected during the monitored period. A significant difference may be noted when STEP level sampling is conducted as many samples are discarded.
Elapsed Time	The length of time the monitor session ran in HH:MM:SS format.
Measured Job ID	JES job identifier of the job that was monitored. This field is valid for jobs that were initiated under a job entry subsystem.
Measured Step	The name of the job step which was monitored.
Measured ProcStep	The name of the job step within a cataloged procedure which was monitored.
Measured Program	Name of the program on the EXEC statement of the JCL of the job that was monitored.
Measured ASID	Address space identifier of the job which was monitored.
System	Name of system where job was monitored
SMF ID	The SMFID field contains the one- to four- character name assigned with the system. The SMFID is written as a field in any SMF record created by this system.

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Table 6-1 Monitor History Panel Fields

Field	Description
Exists	Indicator of data set availability. The following values may be displayed in this field: • **YES** - The data set containing the sample data for the monitor instance is available and has not been migrated. • **NO** - The data set is not found. • **ML1** - The data set containing the sample data for the monitor instance exists but is migrated to the DFSMShsm ML1 migration pool. ML1 migration generally goes to disk. • **ML2** - The data set containing the sample data for the monitor instance exists but is migrated to the DFSMShsm ML2 migration pool. ML2 migration generally goes to tape. • **INV** - The data set name is invalid. If this value is displayed, check the entry to make sure the data set name is valid before continuing. • **PER** - A program error occurred. This may indicate a catalog error other than the data set not being found. See your technical support staff for more information.
Dataset name	Data set name of the monitor data set.
Date	The date the sample was taken.
Time	The time the sample was taken.
Invocation Time	The date this sample instance was invoked.
Invocation Date	The time this sample instance was invoked.
Requested Samples	Data set name of the monitor data set.
Error samples	The number of samples which contain errors. The samples are not included in the monitor data set.
Sample Balance	Ratio of measured CPU time to sampled CPU time during the monitored period: $\frac{\text{(TCB Time/Elapsed Time)}}{\text{(\# of Active Samples/Total \# of Samples)}}$ This number provides information about the validity of the sampling data. A value of 1.00 is perfect; a value within the range of 0.85 to 1.15 is adequate. If the value is outside that range, the results of the monitor are less accurate, though still usable. Note that the Sample Balance value may be adequate, even if it is lower than 0.85, if InTune is used on an LPAR with very low priority.
Storage Above	High-water amount of virtual storage above the 16MB line used by the job.
Storage Below	High-water amount of virtual storage below the 16MB line used by the job.

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Table 6-1 Monitor History Panel Fields

Field	Description
Page in Count	Number of page-in operations for the job. A high value in this field may indicate job delays.
OS/390 level	Release level of the operating system where the target job was executed.
CPU type	CPU type of the system on which the sampling was done.
CPU Mdl	CPU model number of the system on which the sampling was done.
CPU Serial	CPU serial number of the system on which the sampling was done.

Table 6-2 lists the Monitor History panel line commands and tells you where to look for more information about each command.

Table 6-2 Monitor History Commands

For information about...	See...
A - Analyze Normal	“Starting Interactive Analysis” on page 7-2
AA - Analyze Active	“Starting Interactive Analysis” on page 7-2
AL - Analyze All	“Starting Interactive Analysis” on page 7-2
AW - Analyze Wait	“Starting Interactive Analysis” on page 7-2
D - Delete	“Deleting a Monitor Definition” on page 5-24
B - Batch Reports	“Submitting a Job to Generate Batch Reports” on page 11-2
V - CSV Reports	Accesses the CSV_Reporting panel which allows you to submit an InTune batch job to create comma-separated value output of InTune analysis reports for the selected profile. These reports can be imported for use with the InTune Spreadsheet Converter. For more information, refer to “Creating InTune Spread Sheet Reports” on page 11-8

If the monitor request has not completed, or has abnormally terminated, these fields may appear as BLANK, ZERO, or NA. The fields will be populated the first time you analyze the monitor.

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Invoking a Monitor for an Active Job

InTune allows you to view information about or start a monitor for any job, started task, or TSO user currently executing in the system. Select Option 2 from the Primary Option Menu to display the Active Jobs panel (Figure 6-4).

Figure 6-4 Active Jobs Panel

```
InTune -------------------------- Active Jobs ------------- ROW 1 to 12 of 371
COMMAND ===>                                                 SCROLL ===> CSR

Primary commands: STAtus                                   Server ID: INTUNE
                                                              Status: ACTIVE
   Line commands: M - Display Monitoring Criteria
                  I - Invoke Monitor  S - Display Active Select Command

                               Sysplex        A/S  Cur Dsp      CPU   EXCP
LC Jobname  Stepname Procstep SysName  ASID  Type Pos Pri REAL Rate  Rate
   ________ ________ ________ ________ _____ ____ ___ ___ ____ _____ _____
>-------------------------------------------------------------------------------
__ *MASTER*                  SYSC         1 STC  NS  255  478
__ *MASTER*                  SYSD         1 STC  NS  255  370
__ PCAUTH   PCAUTH           SYSC         2 STC  NS  241   44
__ PCAUTH   PCAUTH           SYSD         2 STC  NS  249   42
__ RASP     RASP             SYSC         3 STC  NS  255   86
__ RASP     RASP             SYSD         3 STC  NS  255   84
__ TRACE    TRACE            SYSC         4 STC  NS  241   46
__ TRACE    TRACE            SYSD         4 STC  NS  249   52
__ DUMPSRV  DUMPSRV  DUMPSRV  SYSC         5 STC  NS  255  268
__ DUMPSRV  DUMPSRV  DUMPSRV  SYSD         5 STC  NS  255 3088
__ XCFAS    XCFAS    IEFPROC  SYSC         6 STC  NS  255 2429
__ XCFAS    XCFAS    IEFPROC  SYSD         6 STC  NS  255 2128
```

This panel displays a list of jobs, started tasks, and TSO users currently running on all systems in the sysplex. Table 6-3, “Active Jobs Fields,” on page 6-12 contains a description for each field in the Active Jobs panel. Fields marked with an “*” are excluded from view by default. To display these fields, you must use the CUST primary command. Refer to “Customizing the Display” on page 4-23 for information.

- To monitor a job using default monitoring criteria:

  — Type I in the LC field next to the profile name of the job you want to monitor.

  — Press **Enter**.

- To monitor a job using criteria other than the defaults:

  — Type M in the LC field next to the profile name of the monitor definition you want to invoke.

  — Press **Enter**.

  The Monitoring Criteria panel is displayed. The profile name will be the same as the job name.

  — Change the monitoring criteria as needed.

  — Press **End** to save your changes, or type CANCEL in the COMMAND field and press Enter to return to the Active Jobs panel without starting a monitor.

  — Type I in the LC field next to the profile name of the job

  — Press **Enter**.

After a monitor has been invoked for an active job, you may display its progress or cancel the request using the STAtus primary command (see "Displaying Monitor Request Status" on page 6-4).

Note

If multiple active address spaces have the same jobname, you must invoke the monitor from the Active Jobs panel to ensure that the correct address space is monitored.

Table 6-3 Active Jobs Fields

Field Name	Value
Jobname	The jobname of the address space.
Stepname	The jobstep name, or TSO procedure name for TSO users.
Procstep	The procedure step name, or terminal name for TSO users.
Sysplex SysName	The one- to eight- character name associated with the currently running system within the sysplex.
ASID	The numeric identifier, between 1 and 32766, of the address space.

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Table 6-3 Active Jobs Fields

Field Name	Value
ASID (hex)*	The hexadecimal identifier of the address space. This number may be between x'0001' and x'FFFF'.
A/S Type	The type of address space: • **ASC** - APPC server address space • **BAT** - Job initiated in an initiator • **MNT** - Mount in progress • **OMV** - USS address space • **STC** - Started task • **TSU** - TSO user
Cur Pos	The current position of the job. Possible values are: • **IN** - In Storage • **OT** - Swapped out and ready • **LO** - Logically swapped out • **NS** - Non-swappable • **WM** - Wait queue: MSO • **WL** - Wait queue: long wait • **WT** - Wait queue: terminal wait • **WO** - Wait queue: reasons other than WM, WL, or WT • **DL** - RTO delay • **PR** - Privileged • **>>** Currently being swapped out • **<<** Currently being swapped in
Dsp Pri	The dispatching priority of the address space. This determines the ability of the address space to gain control of the CPU resource when competing with other jobs in the system.
REAL	The average amount of real frames in central storage occupied by the address space for the current jobstep or transaction.
CPU Rate	The percentage of CPU time used by the job. The value is updated when you press Enter and indicates the CPU Rate since the last time you pressed Enter. The value is adjusted for multiple CPUs, if applicable.
CPU Time*	The amount of processor time, including both TCB and SRB, used by the current job step.
TCB Time*	The amount of TCB processor time in seconds used by the current job step.
SRB Time*	The amount of SRB time in seconds used by the current job step.
Delta CPU Time*	The number of CPU seconds used by the job. The value is updated when you press Enter and indicates the number of CPU seconds used since the last time you pressed **Enter**. The value is adjusted for multiple CPUs, if applicable.

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Table 6-3 Active Jobs Fields

Field Name	Value
Delta TCB Time*	The number of TCB seconds used by the job. The value is updated when you press Enter and indicates the number of TCB seconds used since the last time you pressed Enter.
Delta SRB Time*	The number of SRB seconds used by the job. The value is updated when you press Enter and indicates the number of SRB seconds used since the last time you pressed Enter.
EXCP Count*	The total number of EXCPs issued by the current job step.
Delta EXCP*	The number of SSCH instructions issued by the job. The value is updated when you press Enter and indicates the number of SSCH instructions issued since the last time you pressed **Enter**.
Excp Rate	The number of SSCH instructions issued per second for the current transaction or job step.
Scroll right to display the following fields:	
SMFID	The one- to four- character name assigned with the currently running system. The SMFID is written as a field in any SMF record created by this system.
FF Bel	The number of fixed storage frames below 16 megabytes held by the job. If the data gathered for this value is not valid, this field is blank. Fixed storage refers to frames in central storage that cannot be paged-out. Fixed storage is used by programs that cannot tolerate a page fault.
X M*	Cross memory address space. This field contains X for address spaces considered to be 'cross memory address spaces'. This implies that the address space provides services used by other address spaces, and that the address space is accessed in cross memory mode. If the address space is not a cross memory address space, this field is blank.
Priv FF	The number of private fixed storage frames held by the job. If the data gathered for this value is not valid, this field is blank.
Prf Grp	The one-to-four digit number of the performance group associated with the address space. Performance groups are used to assign specific service objectives and execution priority to a group of address spaces.
Dmn	The domain number. Contains the one-to-three digit number of the domain. A domain is a collection of performance groups defined by a system administrator.

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Table 6-3 Active Jobs Fields

Field Name	Value
Lst Swp	The reason for last swap. Identifies the reason for the last swap out associated with the job. If the current position of the job is NS, IN, or PR, this field is blank. Possible values are: • **TI** - Terminal Wait • **TO** - Terminal output wait • **LW** - Long wait • **XS** - Auxiliary storage shortage • **RS** - Central storage shortage • **DW** - Detected wait • **RQ** - Requested swap • **NQ** - Enqueue exchange • **EX** - Exchange swap based on recommendation value • **US** - Unilateral • **TS** - Transition swap • **IC** - Improve central storage usage • **IP** - Improve system paging rate • **MR** - Make room to swap in a user that has been swapped out too long • **AW** - APPC wait • **IW** - USS input wait • **OW** - USS output wait
Service Class*	The one-to-eight character name of the service class. A service class is a group of work within a workload with similar performance goals and characteristics; for example, average response time. You can further divide a service class into performance periods. Periods assign different service objectives and execution priorities to a transaction within a service class, based on the transaction's resource consumption.
Service Period*	The service class period. Contains the performance period of a service class. Possible values range from 1 to 8, which specify varying performance goals and characteristics of transactions of a service class. While executing and consuming resources, transactions can move to a higher period.
Workload*	The one-to-eight character name of the workload assigned to the address space. A workload is a group of work to be monitored, managed, and reported. It consists of one or more service classes.
Resource Group*	The one-to-eight character name of the resource group. Assigning a service class to a resource group effectively guarantees a minimum capacity and sets a maximum capacity for the transactions belonging to the service class.

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Analyzing Monitor Results

You cannot display the results of your analysis directly from the Active Jobs panel. However, when you invoke a monitor from Active Jobs, InTune automatically adds the profile to the Monitor Definition panel.

To analyze the monitoring results, return to the Primary Option Menu and select Option 1. Look for the profile with the name of the job or address space you monitored. Use one of the analysis line commands (A, AA, AL or AW) to display the Interactive Analysis menu.

Chapter 7, “Analyzing Monitor Data” describes how to analyze the data you collected.

Active Jobs Select Command

Type S next to a Jobname and press **Enter** to invoke the Display Active Select command specified in your user profile (see “Setting Up InTune Profile Parameters” on page 2-48). The command will be issued on the local system, even if the selected job is running on a different system in the sysplex.

Note

Split screen mode may not be available when you invoke the Display Active Command.

Analyzing Monitor Data

This chapter describes how to use the Interactive Analysis Facility to analyze the data collected during a monitor session. The following topics are discussed:

Starting Interactive Analysis 7-2
Overview of the Interactive Analysis Options 7-4
Interactive Analysis Option 0 - OverView 7-9
Interactive Analysis Option 1 - TaskView 7-15
Interactive Analysis Option 2 - DelayView 7-20
Interactive Analysis Option 3 - CodeView 7-31
Interactive Analysis Option 4 - TimeView 7-39
Interactive Analysis Option 5 - DataView 7-41
Interactive Analysis Option 6 - TranView 7-55
Interactive Analysis Option 7 - ModView 7-59
Interactive Analysis Option 8 - PoolView 7-65
What Next? 7-66

Note

Chapter 8, “Working with Interactive Analysis - A Demonstration” provides examples of typical InTune analysis, using the TUNCOB01 demonstration program.

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Starting Interactive Analysis

1. Select Option 1 from the Primary Option Menu.

   The Monitor Definition panel (Figure 7-1) is displayed:

Figure 7-1 Monitor Definition Panel

```
InTune ------------------ Monitor Definition -------------- Row 1 to 2 of 2
COMMAND ===>                                                 SCROLL ===> CSR

Primary commands: ADD xxxx, STAtus                        Server ID: INTUNE
                                                             Status: ACTIVE
Line commands: S - Select   A  - Analyze Normal   D  - Delete
               I - Invoke   AL - Analyze All      DD - Delete w/dsns
               H - History  AA - Analyze Active   B  - Batch Reports
               C - Copy     AW - Analyze Wait     V  - CSV Reports

LC Profile  Status     Schedule Runs Description                Batch Jobname
   ________ __________ ________ ____ ______________________________ _____ ________
>-------------------------------------------------------------------------------
__ ABCDEF1  TSO Logon                ABCDEF1  Inactive   1999/01/08  14:30:39
__ DB2GDBM1 DB2 Test 1               ABCDEF1  Inactive   1998/12/16  10:22:56
__ DB2GDIST DB2 Test 2               ABCDEF1  Inactive   1998/12/16  10:34:31
__ DB2IR2G  DB2 Test 3               ABCDEF1  Inactive   1998/12/16  10:27:43
__ IMSCTB   IMS Test 1               ABCDEF1  Inactive   1998/10/13  16:34:00
__ IMSIR21  IMS Test 2               ABCDEF1  Inactive   1998/12/16  13:09:09
__ IMS41Y   IMS Test 3               ABCDEF1  Inactive   1998/12/22  13:34:51
__ TUNIVP0  InTune test              ABCDEF1  Inactive   1999/01/13  11:25:24
__ TUNIVP1  Demonstration program    ABCDEF1  Inactive   1999/01/08  14:45:45
```

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2. Type one of the following line commands in the LC field next to the profile you want to analyze.

Table 7-1 Monitor Definition Line Commands for Data Analysis

Line Command	Description
H	**History -** Displays the Monitor History panel, which lists information about each monitor session invoked for the monitor profile selected. From here, you may analyze the data gathered during any monitor session. Refer to “Displaying Monitor History” on page 6-6 for more information.
A	**Analyze Normal -** Information which is not directly related to the target application is eliminated. Data is reported as follows: • Samples related to delay categories such as Waiting for CPU, LPAR delay, and Swap delay are omitted from reports. • Delayview, TimeView, Dataview, and Modview show all relevant delays for the application. All relevant samples, both active and wait, are reported. • CodeView and related histograms report only active samples, to emphasize the most CPU-intensive portions of the program code. Wait samples, which can mask this activity, are not included.
AL	**Analyze All -** Percentages are calculated based on all samples. This allows you to compare delays occurring when the program is executing in both active and wait states.
AA	**Analyze Active -** Percentages are calculated based on samples where the program was actively using CPU. Samples which contain only wait information are filtered out. This allows you to make normalized CPU comparisons of program activity.
AW	**Analyze Wait -** Percentages are calculated based on samples where the program was in a wait state. Samples which contain only active information are filtered out. This allows you to make normalized comparisons of program wait activity.

3. Press **Enter**.

The Interactive Analysis menu (Figure 7-2) is displayed:

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Figure 7-2 Interactive Analysis Menu

```
InTune --------------------- Interactive Analysis ---------------------------
OPTION  ===>

Enter option to analyze monitored job step:                Profile: TUNIVP1
                                                           Options: NORMAL

          0  OverView   - View monitor session information
          1  TaskView   - Activity by task
          2  DelayView  - Program delays
          3  CodeView   - Program activity
          4  TimeView   - Samples by time
          5  DataView   - Dataset information
          6  TranView   - Activity by transaction
          7  ModView    - Module layout
          8  PoolView   - Buffer pools


Press END to return to Monitor Definition panel
```

Options Pop-up Window:

To display current analysis information, place the cursor on the Options field and press **Enter**. A window is displayed which shows the analysis type and any tasks or transactions selected.

4. To select an analysis option, type the number of the option and press **Enter**. Each option is described in the following sections.

Overview of the Interactive Analysis Options

Table 7-2 describes each interactive analysis option, including the available line commands and subsequent displays with page number in parenthesis. The line commands (LC) are listed for each panel, followed by the panel or window displayed when you press **Enter**. If there is more than one panel listed for a single line command, the panel displayed depends on the type of information selected.

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Table 7-2 Interactive Analysis Options

Analysis Option	LC	Displays...	LC	Displays...	LC	Displays...
0 - OverView (10)	—	Monitor Overview panel (10)				
1 - TaskView (15)	T	TaskView for selected tasks only				
	U	TaskView for selected tasks only (minus deselected tasks)				
	C	Code Details for selected task	A	Csect Associations window (16)		
			C	Callerid panel (28)	L	ISPF program listing (29)
			D	Delayed Resources panel (25)		
			I	Module/Csect Info window (30)		
			L	ISPF program listing (29)		
			S	Delay Distribution window (31)		
			H, NH	Histogram (35)	D	DelayView panel (20)
					L	ISPF program listing (29)
	D	DelayView Details for selected task	A	**Note:** Refer to the line commands description from Option 2 - DelayView, line command A, on page 6.		

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Table 7-2 Interactive Analysis Options

Analysis Option	LC	Displays...	LC	Displays...	LC	Displays...
2 - DelayView (20)	A	Delay Locations panel (23)	L	ISPF program listing (29)		
			D	Delayed Resources panel (25)	S	Dataset Details panel (26)
						Delayed Resource panel (27)
						Delay Detail Data panel (27)
			C	Callerid panel (28)	L	ISPF program listing (29)
			I	Module/Csect Info window (30)		
	S	Delay Distribution window (31)				
3 - CodeView (32)	A	Csect Associations window (16)				
	C	Callerid panel (28)	L	ISPF program listing (29)		
	D	DelayView panel (20)	**Note:** Refer to the line commands description from Option 2 - DelayView on page 6.			
	I	Module/Csect Info window (30)				
	L	ISPF program listing (29)				
	S	Code Distribution window (38)				
	H, NH	Histogram panel (35)	D	DelayView panel (20)		
			L	ISPF program listing (29)		

Table 7-2 Interactive Analysis Options

Analysis Option	LC	Displays...	LC	Displays...	LC	Displays...
4 - TimeView (39)	D	Delayed Resources panel (25)	S	Dataset Details panel (26)		
				Delayed Resource panel (27)		
				Delay Detail Data panel (27)	S	Dataset Details panel (26)
5 - DataView (42, 2)	S	Dataset Details panel (26)				
		DB2 Statements panel (3)	S	SQL Statements panel (6)	E	RxD2 Explain panel (7)
			SD	DCL Statement panel (9)		
			E	RxD2 Explain panel (7)		
			C	Code Details	Note: Refer to the line commands description for Option 3 - CodeView on page 6.	
		IMS Statements panel (3)	S	Segment Search Arguments panel (6)		
		Adabas Statements panel (3)				
		CA-Datacom Statements panel (3)				

Table 7-2 Interactive Analysis Options

Analysis Option	LC	Displays...	LC	Displays...	LC	Displays...
6 - TranView (56, 4)	T	TranView for selected transactions only				
	U	TranView for selected transactions only (minus deselected transactions)				
	C	Code Details for selected task	A	Csect Associations window (16)		
			C	Callerid panel (28)	L	ISPF program listing (29)
			D	Delayed Resources panel (25)		
			I	Module/Csect Info window (30)		
			L	ISPF program listing (29)		
			S	Delay Distribution window (31)		
			H, NH	Histogram (35)	D	DelayView panel (20)
					L	ISPF program listing (29)
	D	DelayView Detail for selected task	A	**Note:** Refer to the line commands description from Option 2 - DelayView, line command A, on page 6.		
7 - ModView (60)	S	Module/Csect Info window (30)				
	U	Link Suggestions panel (64)				

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Table 7-2 Interactive Analysis Options

Analysis Option	LC	Displays...	LC	Displays...	LC	Displays...
8 - PoolView (65, 6)	S	Shared Pools panel (7)	S	Pool Details panel (12)		
			D	Pooled Data Sets panel (12)	S	Dataset Details panel (3)

Interactive Analysis Option 0 - OverView

The OverView option displays the Monitor OverView report (Figure 7-3), which includes information about the monitoring process, key global statistics about the monitored application, as well as sampler messages related to the analysis of your job.

These statistics can help you determine the next most logical panel to display as you continue your analysis.

Scroll down to view the entire report. Table 7-4, “Monitor OverView Fields,” on page 7-11 explains the information on the Monitor OverView report.

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Figure 7-3 Monitor OverView Report

```
InTune ----------------------- Monitor OverView ------------ ROW 1 to 18 of 60
COMMAND ===>                                                  SCROLL ===> CSR

                                                           Profile: TUNIVP1
                                                           Options: Normal
Sampler Statistics
-------------------------------------------------------------------------------
Monitor Data Set:  TUN21.ABCDEF1.TUNIVP1.D1999131.T141927
Final Rate:        10Msec   Start Date: 1999/05/11     CICS Lvl: **N/A**
Samples:             1352   Start Time: 14:19:58       DB2 Lvl:  **N/A**
Sample Balance:      0.60   Elapsed:    00:00:21       IMS Lvl:  **N/A**

Job Statistics                                         System Statistics
-----------------------------------------------        -------------------------
Jobname:   TUNIVP1          TCB Time:    11.09         MVS Lvl:   SP6.0.3
Stepname:  IVP              SRB Time:     1.47         CPU Type:  9672
Procstep:                   Active%:     85.05         CPU Model: 15
Program:   TUNCOB01         Wait%:       14.94         Serial:    01317
ASID:      0020 (32)        Swapped%:     0.00         SMFID:     SYSD
User ID:   ABCDEF1          NonDisp%:    14.79
Job ID:    JOB03090         ProcDly%:     0.00
                            <Storage:   92.00K
EXCP-Cnt:  2686             >Storage:   4.000K
SIO-Rate:  122.59           Page-Sec:     0.00
                            Page-In:         0

Resource Demand Chart
-------------------------------------------------------------------------------
Resource   Type ----1----2----3----4----5----6----7----8----9----0
TUNCOB01   CPU  99++9998999899998999997998889993988+9989979988989
BIGBLOCK   I/O  ..............................................
UNBLOCK    I/O  .1...1.11112.1111.111.31111111...111..111111.11111

Sampler Messages
-------------------------------------------------------------------------------
+-------------------------------------------------+
TN0495I InTune ECSA packet initialized at 0F32E000
TN0101I Profile: TUNIVP1  now sampling JOB: TUNIVP1  PGM: TUNCOB01
TN0102I Profile: TUNIVP1  USERID: ABCDEF1  Data set:
        TUN21.ABCDEF1.TUNIVP1.D1999131.T141927
TN0104I Profile: TUNIVP1  Initial sampling rate: 0010, Samples: 06000,
        Elapsed: 00060
TN8091I Profile: TUNIVP1  01.07  Samples: 01595 /01594 /00000
TN0106I Profile: TUNIVP1  Final sampling rate: 0010, Samples: 06000, Elapsed:
        00060

Sampling Options from Profile
-------------------------------------------------------------------------------
Jobname:      TUNIVP1      Incl Task1:               Excl Task1:
Step Name:                 Incl Task2:               Excl Task2:
Procstep:                  Incl Task3:               Excl Task3:
Program Name:              Incl Task4:               Excl Task4:

Incl Tran 1:               User  ID 1:               Term  ID 1:
Incl Tran 2:               User  ID 2:               Term  ID 2:
Incl Tran 3:               User  ID 3:               Term  ID 3:
Incl Tran 4:               User  ID 4:               Term  ID 4:

              Batch Reports:        Batch Report EXEC:
       Total Time to Monitor: 60
Number of Samples to Collect: 6000
    DD name for load modules:
      Delay after step start: 0
         Monitor valid range: from 0000  to 0000
```

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Determining the Validity of the Sample Data

The Monitor OverView report presents a high-level view of the application you are monitoring, gives you a preliminary indication of job performance, and helps you determine if the sample is valid for the unit of work you have targeted. Check the following fields to determine if the sample is valid.

Table 7-3 Monitor Overview Fields to Check

Look at...	Make sure that...
Samples	The number of samples should be enough to ensure accurate data. The number should be greater than 1000. A number closer to 10000 is preferred.
Program	The name of the program you intended to monitor is displayed.
Sampler Messages	The number of errors encountered is less than one percent of the total number of samples. Message TN8091I indicates the number of SRBs scheduled, the number of samples taken, and the number of recoverable errors (“Samples: # of SRBs / # of samples / # of errors”).

Table 7-4 Monitor OverView Fields

Field Name	Value
Profile	Name of the profile you specified when you created the monitor definition.
Options	Type of analysis in effect: NORMAL, ALL, ACTIVE, or WAIT. An asterisk (*) following the value indicates that tasks or transactions have been selected for analysis. Place the cursor on the Options field value and press Enter to display a pop-up window listing the selected tasks/transactions.
Monitor Data Set	Name of the data set containing the sample data from the monitor.
Final Rate	Final sampling rate, which is the number of samples per millisecond, calculated by InTune. InTune may have adjusted this rate during sampling.
Samples	Number of samples gathered during the monitored period. For reasonable analysis results, this number should be at least 1000, preferably closer to 10000.

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Table 7-4 Monitor OverView Fields

Field Name	Value
Sample Balance	Ratio of measured CPU time to sampled CPU time during the monitored period: $$\frac{\text{(TCB Time/Elapsed Time)}}{\text{(\# of Active Samples/Total \# of Samples)}}$$ This number provides information about the validity of the sampling data. A value of 1.00 is perfect; a value within the range of 0.85 to 1.15 is adequate. If the value is outside that range, the results of the monitor are less accurate, though still usable. Note that the Sample Balance value may be adequate, even if it is lower than 0.85, if InTune is used on an LPAR with very low priority.
Start Date	Date the sampling started.
Start Time	Time the sampling started.
Elapsed	Total time of the monitor in the format of HH:MM:SS.
CICS Lvl	Release level of the CICS system used by the job. This field displays **N/A** unless CICS was detected for the job being monitored.
DB2 Lvl	Release level of the DB2 system used by the job. This field displays **N/A** unless DB2 was detected for the job being monitored.
IMS Lvl	Release level of the IMS system used by the job. This field displays **N/A** unless IMS was detected for the job being monitored.
Jobname	Name of the job that was monitored.
Stepname	If no cataloged procedure is used, this field contains the stepname on the EXEC statement that invoked the program. If a cataloged procedure is used, this field contains the name of the step that invoked the procedure.
Procstep	If a cataloged procedure was used, this field contains the procedure stepname.
Program	Name of the program on the EXEC statement of the JCL for the job.
ASID	Address space identifier of the job that was monitored.
User ID	Identifier of the user who requested the sampling. If the monitor was invoked by a batch job using TUNCALL, this field displays the name of the batch job.
Job ID	JES job identifier of the job that was monitored.

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Table 7-4 Monitor OverView Fields

Field Name	Value
EXCP-Cnt	Number of input/output operations for the job during the monitored period.
SIO-Rate	Number of start I/O operations per second during the monitored period.
TCB Time	Amount of CPU time used by execution of code in task mode during the monitored period. It is obtained from the ASCB.
SRB Time	Amount of CPU time used by execution of code in SRB mode during the monitored period. It is obtained from the ASCB.
Active%	Percentage of the monitored period during which one or more CPUs were in use by application tasks within the address space. This is the ratio of samples with detected CPU activity to the total number of samples.
Wait%	Percentage of the monitored period during which application tasks within the address space were not using CPU. This is the ratio of samples with no detected CPU activity to the total number of samples.
Swapped%	Percentage of samples where InTune detected that the address space was swapped out. This is the ratio of samples where the address space was swapped out to the total number of samples.
NonDisp%	Percentage of samples where InTune detected the address space to be dispatchable but not dispatched. This is the ratio of samples in which the address space was dispatchable but not dispatched to the total number of samples.
ProcDly%	Percentage of the monitored period when InTune detected the address space was unable to be dispatched because a processor could not be made available. While this is occurring, the application is unable to execute.
<Storage	High-water amount of virtual storage below the 16 MB line used by the job.
>Storage	High-water amount of virtual storage above the 16 MB line used by the job.
Page-Sec	Number of paging operations per second for the job.
Page-In	Number of page-in operations for the job. A high value in this field may indicate job delays.
MVS Lvl	Release level of the MVS system where the target job executed.
CPU Type	CPU type of the system on which the sampling was done.
CPU Model	CPU model number of the system on which the sampling was done.

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Table 7-4 Monitor OverView Fields

Field Name	Value
Serial	Serial number of the processor on which the sampling was done.
SMFID	System Management Facility identifier for the OS/390 image on which the sampling was done.
Resource Demand Chart	Approximate percentage of time the application spent either running on a CPU or being delayed for data over the life of the monitor run. The total monitor run is split into 50 equal periods, each period being 2% of the total run. The activity is summarized into each slot by resource type. In this way, you see an overview of the resource demands during the monitor run.
Resource	Name of task or file.
Type	Type of resource: CPU (application active on processor for a task), I/O (application delayed for I/O on a DDname), DB2 (application delayed for DB2 statement on DBRM resource), or IMS (application delayed for IMS segment on PSB resource).
Chart	Fifty columns of numbers that depict the time spent by the program executing on a CPU or delayed for data for each period. The percentages shown are single digits that represents from 0% to 100% +/- 5%. When the percentage is 5% or less a '.' is displayed. When the percentage is 95% or greater a '+' is displayed.
Sampler Messages	Messages issued by the InTune Server Space during the monitored period. These messages provide additional information about InTune's execution, completion, sampling rate, and number of samples.
Sampling Options from Profile	Sampling options you specified in the Monitor Criteria panel. See Table 5-3, "Monitoring Criteria Fields," on page 5-9 for information about these fields.

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Interactive Analysis Option 1 - TaskView

TaskView provides information about the components of the monitored address space. When first invoked, the TaskView panel (Figure 7-4) displays all of the monitored tasks. You may select specific tasks to focus your analysis

Figure 7-4 TaskView Panel

```
InTune --------------------------- TaskView ------------------ ROW 1 to 5 o
COMMAND ===>                                                 SCROLL ===> CSR

Primary commands: SELect, RECall, ADDHelp                     Profile: D241C
                                                              Options: NORMA
   Line commands: T - Tag    C - Code Details
                  U - Untag  D - Delay Details

LC Program  T Actv% Data% System% VolWait% InvWait% Other% Total% Visual
   ________ _ _____ _____ _______ ________ ________ ______ ______ __________
-------------------------------------------------------------------------------
__ DSNECP10   77.97  3.39    0.00     0.00     3.39   0.00  84.75 =========
__ DSN         0.00  1.69    0.00     3.39     0.00   0.00   5.08
__ IKJEFT09    0.00  3.39    0.00     1.69     0.00   0.00   5.08
__ IKJEFT01    0.00  3.39    0.00     0.00     0.00   0.00   3.39
__ IKJEFT02    0.00  1.69    0.00     0.00     0.00   0.00   1.69
```

TaskView displays one line for each unique task detected during the monitored period. From this perspective, you see which tasks are delayed and the reasons for the delay. InTune reports on all tasks in the address space except the initiator and dump services.

Table 7-5 describes the available commands for TaskView.

Table 7-5 TaskView Commands

Command	Description
SELect	Selects only the tagged tasks for analysis.
RECall	Displays all tasks for analysis.
ADDhelp	Invokes the Content-sensitive help application to update or create a help entry for the selected content.
T	Tag line command. Used to select up to five tasks for analysis.
U	Untag line command. Used to deselect a task.

Table 7-5 TaskView Commands

Command	Description
C	CodeView Detail line command. Used to display the CodeView Detail panel showing activity detected by InTune. The CodeView Detail panel is described on page 18.
D	DelayView Detail line command. Used to display the DelayView Detail panel showing the types of delays encountered by InTune. The DelayView Detail panel is described on page 19.

Table 7-6 describes the delay information displayed on the TaskView panel.

Table 7-6 TaskView Fields

Field Name	Value
Profile	Name of the profile you specified when you created the monitor definition.
Options	Type of analysis in effect: NORMAL, ALL, ACTIVE, or WAIT. An asterisk (*) following the value indicates that tasks or transactions have been selected for analysis. Place the cursor on the Options field value and press Enter to display a pop-up window listing the selected tasks/transactions.
Program	Program name associated with the task. If a program name can not be identified, the value **n/a** is substituted.
T	“X” indicates task has been tagged for analysis.
Actv%	Percentage of the monitored period that the CPU was actively processing the monitored application.
Data%	Percentage of the monitored period that the application was delayed because of an I/O request.
System%	Percentage of the monitored period that the application used system services. Examples of these services are storage management and security checking.
VolWait%	Percentage of the monitored period that the application voluntarily waited for an event.
InvWait%	Percentage of the monitored period that the application waited because one of the following situations occurred: The address space was swapped out and unable to run. The address space was swapped in, but was not given control of the CPU.

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Table 7-6 TaskView Fields

Field Name	Value
Other%	Percentage of the monitored period that was not attributable to any of the categories known to InTune.
Total%	Sum of the other six categories of delay.
Visual	Graphical representation of the Total% field.

Selecting Tasks for Analysis

1. Type T next to the tasks you wish to select for analysis.
2. Press **Enter**.

   An X will be displayed in the T column indicating which tasks are selected.

   To deselect a task, type U next to it and press **Enter**.
3. Type SEL.
4. Press **Enter**.

   The TaskView panel will only show the selected tasks, with all percentages calculated for the selected tasks only.
5. To redisplay all tasks, type REC and press **Enter**.

Note

The task **N/A** (not associated) is calculated from samples representing activity not associated with any particular task; for example, address space swapping.

CodeView Detail

Use the CodeView Detail (C) line command from the TaskView panel to display the program activity associated with a specific task; see Figure 7-5.

Figure 7-5 CodeView Detail Panel

```
InTune -------------------- CodeView Detail ----------------- ROW 1 to 9 of 24
COMMAND ===>                                                  SCROLL ===> CSR

            Task: DSNECP10                                   Profile: D241COB
                                                             Options: NORMAL
Primary commands: MOde Pseudo/Module/Csect/4GL,                 Mode: CSECT
                  PSEudo, REGister, ADDHelp

   Line commands: A - Associate     C - Callerid     D - Delays
                  I - Info          L - Listing      S - Distribution
                  H - Histogram    NH - Normalized Histogram

LC Module   Csect    Csect Description         L C Actv% Wait% Totl% Visual
   ________ ________ ________________________ _ _ _____ _____ _____ __________
>-------------------------------------------------------------------------------
__ DSN8EAE1 DSN8EAE1                          B   13.56  0.00 13.56 =========>
__ DSNIDM   DSNISFS  Table scan to evaluate se A   11.86  0.00 11.86 =======>
__ DSNBBM   DSNB1GET Retrieve requeued page    A   10.17  0.00 10.17 ======>
__ DSNIDM   DSNIRCLS                          A    5.08  0.00  5.08 ==>
__ HASCHAM  HASCHAM                           B    0.00  3.39  3.39 =>
__ .XMS0077 DB2GDBM1                               3.39  0.00  3.39 =>
__ DSNECP10 DSNECP16 Perform run subcommand    B    1.69  1.69  3.39 =>
__ DSNIDM   DSNIELIK Evaluate like predicate   A    3.39  0.00  3.39 =>
__ DSNIDM   DSNIREDR Execute DB procedures     A    3.39  0.00  3.39 =>
```

This panel displays which modules and Csects delayed a task which is identified in the Task: field. The commands you can issue and field headings are identical to the CodeView panel (see page 31). All subsequent associated panels report information for the specified task.

Note

The CodeView Detail panel reports both Active and Wait activity percentages for Analyze Normal mode, to account for all activity reported in TaskView.

DelayView Detail

Use the DelayView Detail (D) line command to display the delay categories detected by InTune associated with a specific task; see Figure 7-6.

Figure 7-6 DelayView Detail Panel

```
InTune ------------------- DelayView Detail ------------------ ROW 1 to 5 of 5
COMMAND ===>                                                   SCROLL ===> CSR

            Task: DSNECP10                                    Profile: D241COB
                                                               Detail: ON
Primary commands: DETail on/off,       Module: *
                  ADDHelp               Csect: *
                                       Offset: *
   Line commands: A - Address

LC Major category       Minor category       Actv% Wait% Totl% Visual
   ____________________ ____________________ _____ _____ _____ __________
--------------------------------------------------------------------------------
__ Data Delay           DB2 Statement        71.19  0.00 71.19 =========>
__ Program Active       Program Active        6.78  0.00  6.78
__ Other Delays         Waiting for CPU       0.00  3.39  3.39
__ Data Delay           IO Queued             0.00  1.69  1.69
__ File Mgmt Delay      Open J SVC            0.00  1.69  1.69
******************************** End of Table ********************************
```

This panel displays what caused a task to be delayed in its execution. The commands you can issue and field headings are identical to the DelayView panel (see page 20). All subsequent associated panels report information for the specified task.

Note

The Delay Detail panel does not support the S (Distribution) line command.

Interactive Analysis Option 2 - DelayView

InTune divides program delays into delay categories. The DelayView option shows the percentage of the monitored period that the program was in a wait state for each category. From the DelayView panel (Figure 7-7), you can further investigate a delay, using the Delay Locations, Delayed Resources, Delay Distribution, and Dataset Details panels.

Note

InTune uses the term delay to encompass all aspects of elapsed time, including time that the program was using CPU.

Figure 7-7 DelayView Panel

```
InTune --------------------------- DelayView ----------------- ROW 1 to 6 of 6
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: DETail on/off           Module: *          Profile: TUNIVP1
                  ADDHelp                  Csect: *          Options: NORMAL
                                          Offset: *           Detail: ON
   Line commands: A - Address
                  S - Distribution

LC Major category       Minor category       Actv% Wait% Totl% Visual
   ____________________ ____________________ _____ _____ _____ __________
--------------------------------------------------------------------------------
__ Program Active       Program Active       83.06  0.00 83.06 =========>
__ Data Delay           IO Queued             0.00  9.62  9.62 >
__ Voluntary Wait       Wait/Waitr SVC        0.00  3.62  3.62
__ File Mgmt Delay      Eov SVC               0.22  1.70  1.92
__ Data Delay           Excpvr SVC            1.55  0.00  1.55
__ DASD Mgmt Delay      Data Facility/SMS     0.22  0.00  0.22
```

Table 7-7 describes the available commands for DelayView.

Table 7-7 DelayView Commands

Command	Description
DETail on/off	Type DETail ON to display minor delay reasons. Type DETail OFF to summarize minor delay reasons by major categories.
ADDhelp	Invokes the Content-sensitive help application to update or create a help entry for the selected content.

Table 7-7 DelayView Commands

Command	Description
A	**Address -** Shows all code locations associated with this type of delay. Displays the Delay Locations panel (see “Displaying Delay Locations” on page 7-22).
S	**Distribution -** Shows the tasks or transactions that have this type of delay. Displays the Delay Distribution application (see “Displaying Delay Distribution” on page 7-30).

Table 7-8 explains the information displayed on the DelayView panel.

Table 7-8 DelayView Fields

Field Name	Value
Module	The asterisk (*) means all modules in the sample set were considered. For more information about displaying information about a particular module, see “Displaying Delay Locations” on page 7-22.
Csect	The asterisk (*) means all the Csects in the sample set were considered. For more information about displaying information about a particular Csect, see “Displaying Delay Locations” on page 7-22.
Offset	The asterisk (*) means all the offsets in the sample set were considered. For more information about displaying information about a particular offset, see “Displaying Delay Locations” on page 7-22.
Profile	Name of the profile you specified when you created the monitor definition.
Options	Indicates the type of analysis in effect: NORMAL, ALL, ACTIVE, or WAIT. An asterisk (*) following the value indicates that tasks or transactions have been selected for analysis. Place the cursor on the Options field value and press Enter to display a pop-up window listing the selected tasks/transactions.
Detail	Indicates the display mode of ON or OFF for delay details.
Major category	Six major categories of delays are shown here: **Program Active** - The application or a called support routine is using CPU. **Other Delays** - The application is delayed by a category unknown to InTune. **File Mgmt Delay** - The application is preparing a file for processing. **Data Delay** - The application is accessing a file. **Voluntary Wait** - The application is voluntarily waiting for resources. **System Active** - The application is using operating system functions such as storage administration or system security. See Chapter 12, “Using InTune to Tune Your Application” for a complete list of categories.

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Table 7-8 DelayView Fields

Field Name	Value
Minor category	More detailed delay category classification. This field is blank if DETAIL OFF is specified. To view the minor delay categories, use the primary command DETAIL ON.
Actv%	Percentage of the monitored period that InTune detected CPU usage for this category of delay.
Wait%	Percentage of the monitored period that InTune detected that the program was in a wait state for this category of delay.
Totl%	Summation of the Actv% and Wait% fields.
Visual	Graphical representation of the Totl% field.

Displaying Minor Delay Categories

DelayView divides each major delay category into minor categories. Minor delay categories are only displayed if Detail: ON is specified for the panel. The default display value is specified on the Profile Parameters panel. You may change the display using the DETail on/off primary command.

Both major and minor delay categories are shown in Figure 7-7 on page 7-20, as indicated by Detail: ON on the right side of the screen. To see only major delay categories, use the primary command DETail OFF.

Displaying Delay Locations

To find the location of a specific delay, type A next to a delay category and press **Enter**. In this example, type A next to the Data Delay line on the DelayView panel and press **Enter**.

The Delay Locations panel (Figure 7-8) is displayed.

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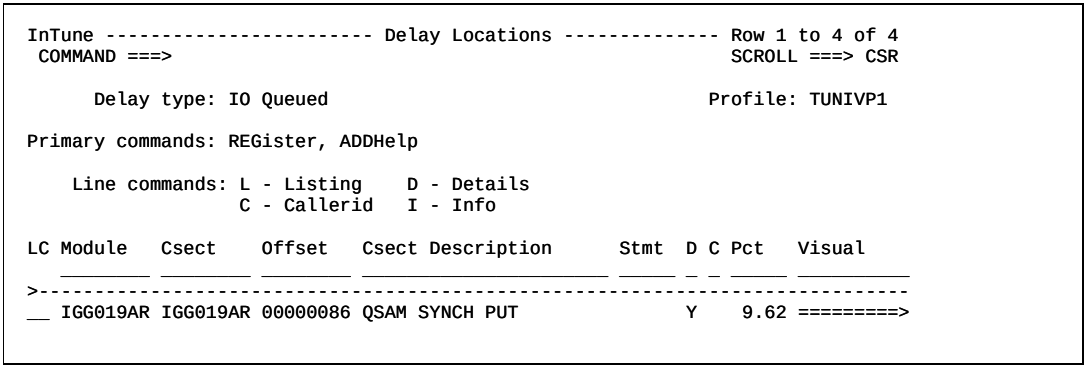
Figure 7-8 Delay Locations Panel



The Delay Locations panel displays a list of module names, Csects, and offsets where the delays were detected. If InTune finds more than one location where a data delay took place, the data is listed in order of decreasing significance.

Table describes the available commands for Delay Locations.

Table 7-9 Delay Locations Commands

Command	Description
REGister	Displays the Program Listing Registration panel, where you can register a program with InTune.
ADDhelp	Invokes the Content-sensitive help application to update or create a help entry for the selected content.
L	**Listing -** Displays the program listing if the program has been registered.
D	**Details -** Displays the Delayed Resources panel with information about the resources and modules related to a delay. Valid only if the D field indicates Y.
C	**Callerid -** Displays the Callerid panel, which contains the names of any calling module/Csect/offset to this program.
I	**Info -** Displays module information such as size, location, and link date for the selected module/Csect.

Table 7-10 describes the information displayed on the Delay Locations panel.

Table 7-10 Delay Locations Fields

Field Name	Value
Profile	Name of the profile you specified when you created the monitor definition.
Module	Module name.
Csect	Control section within the module.
Offset	Hexadecimal offset within the Csect, or, if the Csect is not known, the module.
Csect Description	Description of the Csect, if available.
Stmt	Number of the high-level language statement. This field displays information only for registered programs. For information about registering a program, see “Registering Source Program Listings” on page 9-34.
D	Y in the D (Detail) column indicates that additional information is available by using the **D**etails line command to help isolate the cause of the delays.
C	This field contains a Y if Callerid information is available for this Csect. Callerid provides detailed information about which programs called the Csect being queried.
Pct	Percentage of the monitored period that a delay for this offset is detected.
Visual	Graphical representation of the Pct field.

Displaying Delayed Resources

If there is a Y in the D column on the Delay Locations panel, you can view another level of information. Type D and press **Enter**.

The Delayed Resources panel (Figure 7-9) is displayed.

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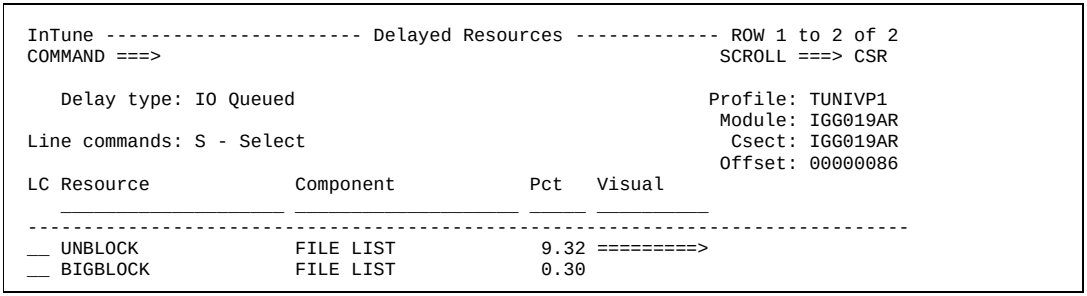
Figure 7-9 Delayed Resources Panel



The Delayed Resources panel shows resources and components related to a delay. Based on the type of delay, the Resource field contains different types of information. Use the **S**elect line command to display more information about the selected resource.

Table 7-11 describes the information displayed on the Delayed Resources panel.

Table 7-11 Delayed Resources Fields

Field Name	Value
Delay type	Category of delay from the DelayView panel for which details are now displayed.
Profile	Name of the profile you specified when you created the monitor definition.
Module	Module name.
Csect	Control section within the module.
Offset	Hexadecimal offset within the Csect, or, if the Csect is not available, within the module.
Resource	Resources delaying the program. Resources vary depending on the delay category. For more information about the types of resources that may cause delays, see Chapter 12, “Using InTune to Tune Your Application”.
Component	Component of the resource delaying the program. Components vary based on the resource.
Pct	Percentage of time during the monitored period that this resource delayed the application.
Visual	Graphical representation of the Pct field.

Displaying Delay Detail

You may display further information about the source of a delay. Type S next to a resource on the Delayed Resources panel (Figure 7-9) and press **Enter**. Depending on the type of resource, one of three panels is displayed.

If the resource is a dataset, the Dataset Details panel (Figure 7-10) is displayed.

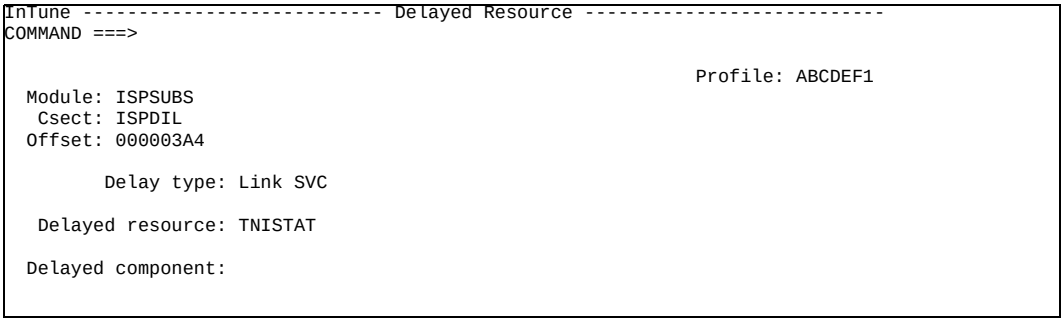
Figure 7-10 Dataset Details Panel

```
InTune ----------------------- Data Set Details -------------------------------
 COMMAND ===>                                                 SCROLL ===> CSR

 DD-Name information for BIGBLOCK                            Profile: TUNCOB01

 Opened for: PUT LOCATE   Acc Meth: SAM       Concatenation count: 000

 Data Set Information for SYS98128.T211644.RA000.TUNCOB04.DOUT1.H --------------

 SMS--------------- Allocation -------------- Format --------------------------
 DATACLAS: PSFILE   Unit:  EXTENDED  CYLINDER DS Org: PS   Rec Fm: F
 STORCLAS: PROD     Primary:            00000 Log Rec Len: 00000 Blk Size: 00000
 MGMTCLAS: PROD     Secondary:          00000 Buf Cnt: 000 Buf Size: 00000
                    Volume count:         000 Stripes: 001 Concat #: 000
                    Curr extent count:  00000 Compressed: YES

 Data Set Performance -----------------------
 Avg Resp Time:   000.0  Avg IOSQ Time: 000.0
 Active rate:     000.0  Avg Pend Time: 000.0
 Total EXCPs:   0000000  Avg Disc Time: 000.0
 Total Conn Time: 00000  Avg Conn Time: 000.0
```

For more information about this panel, refer to page 46.

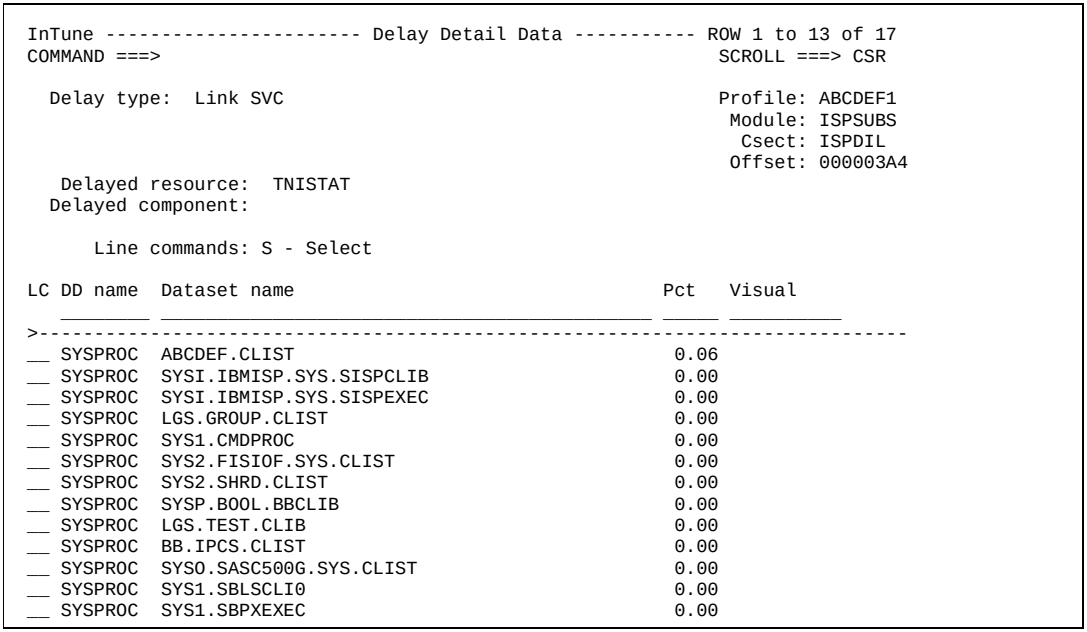
If the resource is not a data set, the Delayed Resource panel (Figure 7-11) is displayed.

Figure 7-11 Delayed Resource Panel



If the resource includes multiple data sets, the Data Detail Data panel (Figure 7-12) is displayed. From this panel, you can use the Select line command to display the Dataset Detail panel (Figure 7-10).

Figure 7-12 Delay Detail Data Panel



Displaying Callerid

If the C column contains a Y for a module on the Delay Locations panel, you can display a list of callers for the Module/Csect. The list of callers is ordered by activity. Type C in the LC field for a module and press Enter.

The Callerid panel (Figure 7-13) is displayed.

Figure 7-13 Callerid Panel

```
InTune --------------------------- Callerid ------------------ ROW 1 to 2 of 2
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: REGister, ADDHelp                          Profile: TUNIVP1
                                                              Module: TUNCOB01
   Line commands: L - Listing                                  Csect: IGZCIN1

LC Module   Csect    Offset   Stmt  Csect Description         Pct   Visual
   ________ ________ ________ _____ ____________________________ _____ __________
-------------------------------------------------------------------------------
__ TUNCOB01 TUNCOB01 000008C6   157 Cobol test program distri 17.27 =========>
__ TUNCOB01 TUNCOB01 0000088C   148 Cobol test program distri  0.88
```

The fields on the Callerid panel are the same as on the Delay Locations panel. See Table 7-10, “Delay Locations Fields,” on page 7-24 for a description of the fields.

Displaying Program Listings

The Callerid panel provides the names of callers of a particular routine. This can be especially helpful when identifying which program called a High Level Language library routine. To view the program listing, type L and press Enter.

The program listing (Figure 7-14) is displayed in ISPF Browse mode, at the location of the routine.

Note

The program must be registered with InTune to view the listings. Refer to "Registering Source Program Listings" on page 9-34 for more information.

Figure 7-14 TUNCOB01 Program Listing

```
BROWSE - ABCDEF1.DEMO.COB2LIST(TUNCOB01) ----------- LINE 00000040 COL 001 080
COMMAND ===>                                                 SCROLL ===> PAGE
     SPACE(1)
   NOSSRANGE
   NOTERM
   NOTEST
     TRUNC(STD)
   NOVBREF
   NOWORD
   NOXREF
     ZWB
PP 5668-958 IBM VS COBOL II Release 4.0 09/15/92                TUNCOB01  Date
  LineID  PL SL  ----+-*A-1-B--+----2----+----3----+----4----+----5----+----6---
  000001         000100  IDENTIFICATION DIVISION.
  000002         000200  PROGRAM-ID.  TUNCOB01.
  000003         000300*-------------------------------------------------------
  000004         000400*
  000005         000500*  THIS TEST PROGRAM IS USED TO VERIFY THE INSTALLATION
  000006         000600*  INTUNE AND TO DEMONSTRATE ITS CAPABILITIES.
  000007         000700*
  000008         000800*  IN THIS PROGRAM WE WILL EXPLORE TWO AREAS AND
  000009         000900*  THEIR EFFECT ON PROGRAM PERFORMANCE.
  000010         001000*
```

Displaying Module/Csect Information

To view detailed information about a load module and Csect listed on the Delay Locations panel, type I for a module and press Enter.

The Module/Csect Info window (Figure 7-15) is displayed.

Figure 7-15 Module/Csect Info Window

```
 InTune ---------------- Module/Csect Info ----------------------
Command ===>

      Module name: TUNCOB01           Rent: N
          Address: 00006408           Reus: N
           Length: 00013BF8           Ovly: N
       Date stamp: 1999/03/25         Load: N
   Link component: 5695DF108          Exec: Y
          Dataset: TUN.TEST.LOAD

       Csect name: TUNCOB01           Amode: 24
           Offset: 00000000           Rmode: 31
           Length: 00000F20            Type: SD
    Translator id: 566895801
     Compile Date: 1999/03/25
```

The information in the Module/Csect Info window is similar to the information displayed in the ModView panel. For a description of the fields, refer to Table 7-24, “ModView Fields,” on page 7-61.

Displaying Delay Distribution

To find the tasks causing a specific delay, type S next to a delay category on the DelayView panel and press Enter. The Delay Distribution panel (Figure 7-16) is displayed:

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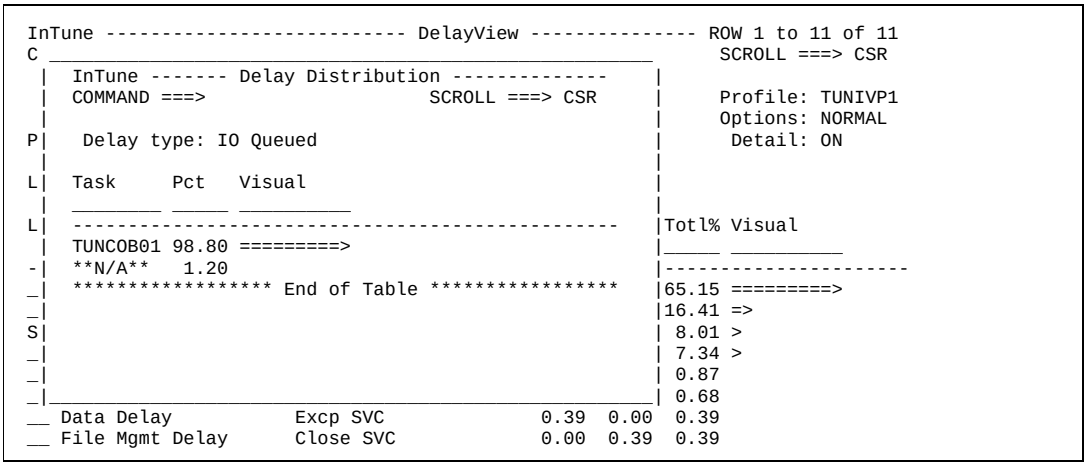
Figure 7-16 Delay Distribution Panel



The Delay Distribution panel displays the distribution of samples during the monitored period which were attributed to a specific task. The percentage of the number of samples that relate to each task is displayed.

Note

For IMS or CICS, the display shows the distribution of samples for the specific transactions run by the transaction manager and not for the tasks in the address space.

Interactive Analysis Option 3 - CodeView

CodeView displays the execution and wait time of each module used by the program. You can display this information in greater detail. You can define Pseudo Groups specific to your environment to summarize the information for multiple modules. This enables you to identify time-consuming areas of code and to associate subroutines within a program and program modules within an application framework.

The CodeView panel (Figure 7-17) displays information from the perspective of the monitored program

Figure 7-17 CodeView Panel Showing Csects with Activity

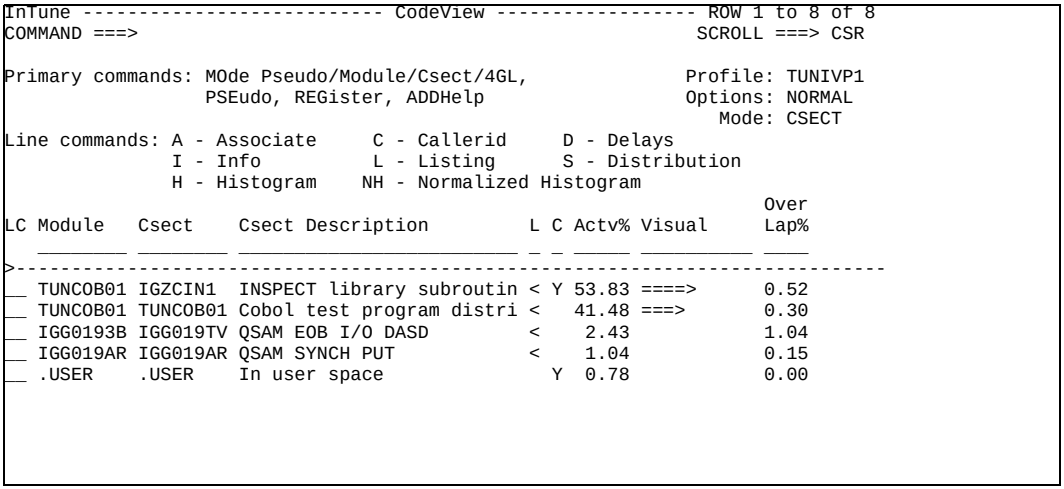


Table 7-12 describes the primary and line commands available for CodeView.

Table 7-12 CodeView Commands

Command	Description
MODE	Specify the way Module/Csect information is displayed. Type one of the following commands and press **Enter**: **MODE PSE -** to display a summarization of module activity by pseudo group. The CSECT field will not be displayed. **MODE MOD -** to display the activity of each Module detected by InTune during the monitored period. The CSECT field will not be displayed. **MODE CSE -** to display the activity of each Csect detected by InTune during the monitored period. This is the default setting. **MODE 4GL -** to display the activity of Adabas, Natural, and CA-Datacom routines. Refer to Chapter 16, “Using InTune with a Non-IBM Database” for more information.
PSEudo	Displays the Pseudo Group Definitions panel, where you can group Modules into functional groups. Refer to “Defining Pseudo Groups” on page 9-16.
REGister	Displays the Program Listing Registration panel, where you can register a program with InTune.
ADDhelp	Invokes the Content-sensitive help application to update or create a help entry for the selected content.

Table 7-12 CodeView Commands

Command	Description
D	**Delays -** Provides detailed location information about delays within this delay type.
L	**Listing -** Displays the program listing. Valid only if the listing is registered with InTune.
S	**Distribution -** Shows the proportion of time a specific module or module/Csect executed under a task or transaction.
C	**Callerid -** Identifies the callers of this module/Csect by name and offset.
A	**Associate -** Accesses the Csect Associations application.
H	**Histogram -** Creates an address execution map of the program. Shows where the application was executing or waiting for data or service.
NH	**Normalized Histogram -** Creates an address execution map of the program. Shows where the application was executing or waiting for data or service. This is the same as the H line command except the percentages shown are normalized for the selected Csect.
I	**Info -** Retrieves information such as size, location, and link date for the selected load module.

Table 7-13 describes the fields displayed on the CodeView panel.

Table 7-13 CodeView Fields

Field Name	Value
Profile	Name of the profile you specified when you created the monitor definition.
Options	Indicates the type of analysis in effect: NORMAL, ALL, ACTIVE, or WAIT. An asterisk (*) following the value indicates that tasks or transactions have been selected for analysis. Place the cursor on the Options field value and press Enter to display a pop-up window listing the selected tasks/transactions.
Mode	Indicates the current display mode: PSUEDO, MODULE, CSECT, or 4GL.
Group	The pseudo group name defined for the module. Refer to “Defining Pseudo Groups” on page 9-16.
Module	The module name.
Csect	The Control Section within the module.
Csect Description	Description of Csects, if available. Scroll right to display the extended description.

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Table 7-13 CodeView Fields

Field Name	Value
L	If the program was loaded above the 16MB line in extended virtual memory, this field contains the symbol >. If the program was loaded below the 16MB line, this field contains the symbol <. If InTune cannot detect where the program was loaded, this field is blank.
C	If Callerid information is available, this field contains a Y. If Callerid information is not available, this field is blank.
Actv%	Percentage of the monitored period when a CPU was in use. InTune calculates this value as the ratio of samples in which it detected CPU activity to the total number of samples.
Wait%	Percentage of the monitored period when the Csect was not using CPU. InTune calculates this value as the ratio of samples in which it detected no activity to the total number of samples. This field is not displayed for Analyze Normal mode.
Totl%	Summation of the Actv% and Wait% fields.
Visual	Graphical representation of the Totl% field.
Overlap%	Percentage of the monitored period when both the CPU was active and file access was occurring. Scroll right to display.

Displaying Csect Activity Locations

The Histogram panel shows the activity associated with a Csect. A Csect is divided into segments of a specified size in bytes, and the activity detected in each segment is displayed. To view activity locations:

1. Use either the **H**istogram or the **N**ormalized **H**istogram line command.

   - If you use the H line command, the values displayed in Histogram add up to the value of the selected Csect (from the Totl% field).

   - If you use the NH line command, the values displayed in Histogram add up to 100 percent.

2. Press **Enter**.

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The Histogram panel (Figure 7-18) is displayed:

Figure 7-18 Histogram Panel Showing TUNCOB01 Csect (Group Size 32 bytes)

```
InTune --------------------------- Histogram --------------- ROW 1 to 12 of 19
COMMAND ===>                                                  SCROLL ===> CSR

  Group ===> 32     (Group size in bytes or STMT)            Profile: TUNIVP1
                                                           Normalized: NO
Primary commands: REGister, ADDHelp                       Module name: TUNCOB01

   Line commands: D - Delays  L - Listing

LC Csect    Offset   Length Actv% Visual
   ________ ________ ______ _____ __________
-------------------------------------------------------------------------------
__ TUNCOB01 00000000     32  0.09
__          00000020   1696  0.00
__          000006C0     32  0.09
__          000006E0     32  0.09
__          00000700     32  0.43
__          00000720     32  0.17
__          00000740     32  0.00
__          00000760     32  0.17
__          00000780     32  0.09
__          000007A0     32  0.09
__          000007C0     32  0.00
__          000007E0     32  0.09
```

Specifying Histogram Group Size

The group size defines the resolution of the histogram. The initial size is set using the Instruction group field of the Profile Parameters panel (Figure 2-15 on page 2-49). The default value is 32 bytes.

1. To change the value of the group size, type over the existing value and press **Enter**. You may specify a value between 2 and 64 bytes.

   Specify 2 in the GROUP field to analyze execution at the lowest possible level.

2. If the source code for the program is registered with InTune, specify STMT in the Group field to display the verb associated with the statement, as shown in Figure 7-19.

Figure 7-19 Histogram Panel Showing TUNCOB01 Csect (Group Size STMT)

```
InTune --------------------------- Histogram --------------- ROW 1 to 12 of 19
COMMAND ===>                                                  SCROLL ===> CSR

  Group ===> STMT   (Group size in bytes or STMT)            Profile: TUNIVP1
                                                           Normalized: NO
Primary commands: REGister, ADDHelp                       Module name: TUNCOB01

   Line commands: D - Delays  L - Listing

LC Csect    Stmt   Verb         Actv% Wait% Totl% Visual
   ________ ______ ____________ _____ _____ _____ __________
------------------------------------------------------------------------------
__ TUNCOB01    104 PERFORM       0.37  0.00  0.37
__             114 SET           0.09  0.00  0.09
__             137 WRITE        12.53  0.00 12.53 =========>
__             138 IF            0.92  0.00  0.92
__             138 GO            3.30  0.00  3.30 =>
__             139 GO            3.12  0.00  3.12 =>
__             146 ADD          10.57  0.00 10.57 =======>
__             147 ADD           0.21  0.00  0.21
__             148 IF            0.03  0.00  0.03
__             149 MOVE          0.12  0.00  0.12
__             156 MOVE          0.31  0.00  0.31
__             157 INSPECT       0.61  0.00  0.61
__             165 MOVE          1.34  0.00  1.34 >
```

Displaying the Program Listing

If the program you are analyzing has been registered with InTune, you may display the program listing at the module/Csect. To view the program listing, type L and press **Enter**. The program listing (as shown in Figure 7-20) is displayed in ISPF Browse mode.

Note

The program must be registered with InTune to view the listings. Refer to “Registering Source Program Listings” on page 9-34 for more information.

Figure 7-20 TUNCOB01 Listing

```
BROWSE - BB.XTSTI.COBLIST(TUNCOB01) ---------------- LINE 00000181 COL 001 080
COMMAND ===>                                              SCROLL ===> PAGE
 000135         010620
 000136         010630*-------------------------------------------------------
 000137         010640*  SUBSCRIPTING
 000138         010650*-------------------------------------------------------
 000139         010660
 000140         010670  SUBSCRIPT2-100.
 000141         010680     ADD RECORD-00 (SUB) TO RECORDB-00 (SUB).
 000142         010690     ADD 1 TO SUB.
 000143         010691     IF SUB LESS THAN 6 GO TO SUBSCRIPT2-100.
 000144         010692     MOVE 1 TO SUB.
 000145         010700
 000146         010800*-------------------------------------------------------
 000147         010900*  INSPECT
 000148         011000*-------------------------------------------------------
```

Displaying Delay Location Information

From the CodeView panel, you can link to the DelayView panel to display the locations and categories for a module/Csect. Type D next to a module and press **Enter**. The DelayView panel (Figure 7-21) is displayed.

Figure 7-21 DelayView Panel

```
InTune --------------------------- DelayView ----------------- ROW 1 to 1 of 1
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: DETail on/off           Module: TUNCOB01   Profile: TUNIVP1
                  ADDHelp                  Csect: IGZCIN1    Options: NORMAL
                                          Offset: *           Detail: ON
   Line commands: A - Address
                  S - Distribution

LC Major category       Minor category       Actv% Wait% Totl% Visual
   ____________________ ____________________ _____ _____ _____ ___________
-------------------------------------------------------------------------------
__ Program Active       Program Active       45.78  0.00 45.78 =========>
```

For compete information about using DelayView, refer to “Interactive Analysis Option 2 - DelayView” on page 7-20.

Displaying Code Distribution

To display the Code Distribution window (Figure 7-22), use the di**S**tribution line command for a specific module or Csect. This window displays the selected module and Csect name, along with all associated tasks or transactions. InTune attributes each sample to one of these tasks or transactions and displays the percentage of samples associated with each.

Figure 7-22 Code Distribution Window

```
InTune -------- Code Distribution --------------
COMMAND ===>                     SCROLL ===> CSR

        Module: IGG019AR      Csect: IGG019AR

TASKID   Pct   Visual
________ _____ __________
-----------------------------------------------
TUNCOB01 100.0 =========>
****************** End of Table *****************
```

Note

For IMS or CICS, the display shows the distribution of samples for the specific transactions run by the transaction manager, not for the tasks in the address space.

Displaying Callerid

From CodeView, you can use Callerid to determine which programs called various subroutines that are causing delays. Callerid information is available if there is a Y in the C column on the CodeView panel.

Callerid is also available from the Delay Locations panel. Refer to “Displaying Callerid” on page 7-28 for a complete description.

Interactive Analysis Option 4 - TimeView

TimeView displays program activity in time sequence. Each row of information on the TimeView panel (Figure 7-23) represents a single sample taken during the monitored period. This format helps you determine a program's execution path and looping logic. This format also gives a good indication of which code sections executed and when they executed during the monitored period.

Figure 7-23 TimeView Panel

```
InTune --------------------------- TimeView -------------- ROW 1 to 13 of 1562
COMMAND ===>                                                SCROLL ===> CSR

Primary commands: ADDHelp                                   Profile: TUNIVP1
                                                            Options: NORMAL
   Line commands: D - Details

LC Sequence Module   CSECT    Offset   Det Calling  Calling  Caller   Task Id
   Number                                 Module   CSECT    Offset
   ________ ________ ________ ________ ___ ________ ________ ________ ________
>-------------------------------------------------------------------------------
__        1 TUNCOB01 TUNCOB01 00000814                                TUNCOB01
__        2 .PROCDLY .PROCDLY 00000000
__        3 TUNCOB01 TUNCOB01 00000858                                TUNCOB01
__        4 TUNCOB01 TUNCOB01 00000810                                TUNCOB01
__        5 TUNCOB01 TUNCOB01 00000834                                TUNCOB01
__        6 TUNCOB01 TUNCOB01 0000081C                                TUNCOB01
__        7 .PROCDLY .PROCDLY 00000000
__        8 TUNCOB01 TUNCOB01 00000826                                TUNCOB01
__        9 .PROCDLY .PROCDLY 00000000
__        9 .PROCDLY .PROCDLY 00000000
__        9 .PROCDLY .PROCDLY 00000000
__        9 .PROCDLY .PROCDLY 00000000
__        9 .PROCDLY .PROCDLY 00000000
__       14 TUNCOB01 TUNCOB01 0000084C                                TUNCOB01
__       15 .PROCDLY .PROCDLY 00000000
__       16 TUNCOB01 TUNCOB01 0000084C                                TUNCOB01
__       17 TUNCOB01 TUNCOB01 000008E0                                TUNCOB01
__       18 TUNCOB01 TUNCOB01 00000826                                TUNCOB01
```

Table 7-14 describes the primary and line commands available for TimeView.

Table 7-14 TimeView Commands

Command	Description
ADDHelp	Invokes the Content-sensitive help application to update or create a help entry for the selected content.
D	**Details -** Provides detail data for the sample. Detail data is available if the DET column displays YES.

Table 7-15 explains the data displayed on the TimeView panel.

Table 7-15 TimeView Fields

Field Name	Value
Profile	Name of the profile you specified when you created the monitor definition.
Options	Type of analysis in effect: NORMAL, ALL, ACTIVE, or WAIT. An asterisk (*) following the value indicates that tasks or transactions have been selected for analysis. Place the cursor on the Options field value and press Enter to display a pop-up window listing the selected tasks/transactions.
Sequence Number	Sample sequence numbers, listed consecutively, from one to the number of samples you requested.
Module	Name of the load module related to the collected sample.
CSECT	Name of the control section that was in control for the sample.
Offset	Offset where the interrupt occurred for the sample. The offset is from the start of the control section shown in the CSECT field. Offset is displayed in hexadecimal notation.
Det	YES in the Det column indicates that additional information is available using the **D**etails line command to isolate the cause of delays.
Calling Module	Name of the module that issued a call for the module in control during the sample.
Calling CSECT	Name of the control section that called the routine that was in control during the sample.
Caller Offset	The offset from the start of the control section shown in the Calling CSECT field where the call to the current module was made. Caller Offset is displayed in hexadecimal notation.

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Table 7-15 TimeView Fields

Field Name	Value
Task ID	The name of the program associated with the task in control when the sample was taken.
Scroll right to display the following field.	
Transact Code	The transaction code from either an IMS/TM or CICS environment.

Displaying Detail Data

If the DET field contains YES, you may display additional detail information about the dataset or resource. Use the **D**etails line command to display the Delayed Resources panel, as described in “Displaying Delayed Resources” on page 7-24.

Interactive Analysis Option 5 - DataView

DataView displays data sets, databases (IMS, Adabas, and CA-Datacom), and DB2 statements which caused activity during the monitored period. The data on the DataView panel (Figure 7-24) is sorted in descending order by activity. You can select a data set, database, or DB2 statement to display greater detail.

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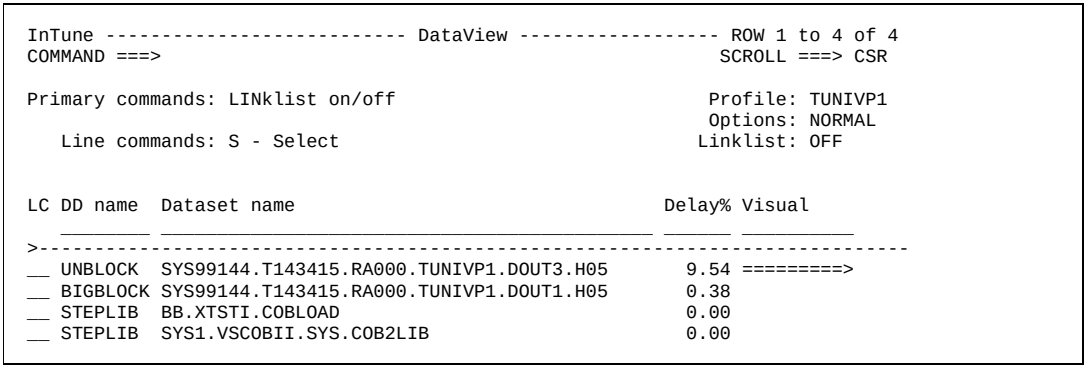
Figure 7-24 DataView Panel



Displaying Linklist Information

To display information about LINKLIST and LPALIST data sets, use the primary command LINKLIST ON. To hide the information once it is displayed, use the primary command LINKLIST OFF.

Displaying Data Set Information

To display relevant information about a data set, use the **S**elect line command to display the Dataset Details panel. If the data set is a VSAM data set, you may see an enhanced Dataset Details panel.

Note

Data set statistics may not be available for very short measurements, or for datasets that are allocated and unallocated for brief intervals (less than two seconds).

Table 7-16 describes the fields in the DataView panel

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Table 7-16 DataView Fields

Field Name	Value
Profile	Name of the profile you specified when you created the monitor definition.
Options	Type of analysis in effect: NORMAL, ALL, ACTIVE, or WAIT. An asterisk (*) following the value indicates that tasks or transactions have been selected for analysis. Place the cursor on the Options field value and press Enter to display a pop-up window listing the selected tasks/transactions.
Linklist	Current Linklist setting of ON or OFF.
DD name	DDNAME used to allocate the data set. For a concatenation, multiple lines are displayed with identical DDNAMEs for each associated data set. For I/O that InTune cannot identify, the pseudo-DDNAME .IO*nnnn* appears in this field, *where nnnn* is the unit address.
Dataset name	Full name of the data set. For a concatenation, multiple lines are displayed with identical DDNAMEs for every data set associated with the DDNAME.
Delay%	Percentage of the monitored period that activity was detected against the DD statement shown. If several data sets are allocated to a single DD statement, this number is repeated for every data set.
Visual	Graphical representation of Delay%.
Scroll right to display the following fields.	
Block Size	Block size of the data set.
Record Length	Logical record length of the records created by the application.
RECFM	Format of the records written to the data set. The following list explains each value: • **F -** Fixed records • **FB -** Fixed blocked records • **V** - Variable records • **VB -** Variable blocked records • **U** - Undefined records
EXCPs	Number of EXCPs issued during the monitor period for this data set. An EXCP is equivalent to reading or writing a single block to or from the data set.
Connect Time	Number of milliseconds during the monitored period representing the end-to-end time for transferring data to or from the external media and memory. Note that this time may exceed the monitored period because of data overlap. This occurs when multiple blocks of data are moved to or from memory concurrently.

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Table 7-16 DataView Fields

Field Name	Value
Open Intent	If the DDNAME is for a data set, this field displays the intention of the program in opening the data set. If the DDNAME is for a database, this field displays the type of database. For data sets, this field contains one of the following values: DIRECT, GET MOVE, GET LOCATE, PUT MOVE, PUT LOCATE, READ, WRITE, MEMBER READ, MEMBER WRITE, PROGRAM LOADING, UNDETERMINED. For databases, this field contains one of the following values: ADA, DB2, DCM, IMS
DSORG	Organization of the data set. The following list explains the possible values: • **DA** - Direct access • **PS** - Physical Sequential • **IS** - Indexed Sequential • **VSAM -** Virtual Sequential Access Method • **PO** - Partitioned Organization
Access Method	Access method used to read from or write to the data set. Possible values are: • **BPAM** - Basic partitioned access method • **BTAM** - Basic telecommunications access method • **EXCP** - Execute Channel Program • **GRPH -** Graphics access method • **DA** - Direct access method • **ISAM** - Indexed sequential access method • **SAM** - Sequential access method • **SUBS** - JES subsystem access • **TAP** - TCAM application access method • **TCAM** - Telecommunications access method • **VSAM** - Virtual sequential access method • **VTAM** - Virtual telecommunications access method
Buffer Size	Buffer size for the data set. This size is generally the same as the Block Size.
Buffer Number	Number of buffers allocated for the data set.
Number Extents	Number of physical extents allocated to the data set. For non-VSAM data sets, this number may be in the range of 1 to 16. VSAM allows up to 128 extents for a data set.
Alloc Unit	Allocation unit for the data set. This field contains one of the following values: • **BLK -** Space is allocated in blocks • **CYL** - Space is allocated in cylinders • **TRK** - Space is allocated in tracks • **DSN** - The DDNAME indicates a database rather than a data set • (blank) - InTune did not detect the unit of allocation.

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Table 7-16 DataView Fields

Field Name	Value
PRI Size	**Primary Unit:** The initial allocation of cylinders, tracks, or blocks for a data set on direct access. Depending on the allocation unit, this field contains the following value: • For CYL, the number of cylinders allocated • For TRK, the number of tracks allocated • For BLK, the number of blocks allocated
SEC Size	**Secondary Unit:** The secondary allocation of cylinders, tracks, or blocks for a data set on direct access. Depending on the allocation unit, this field contains the following value: • For CYL, the number of cylinders allocated • For TRK, the number of tracks allocated • For BLK, the number of blocks allocated
Seq Nr.	InTune sequence number of the record. This sequence number is incremented by InTune for each scheduling of the sampler into the target address space.
UCB Addr	Unit Control Block number for this data set. The UCB is the logical device number, expressed in hexadecimal, on which this data set resides.
VOLSER(s)	First six volume serial numbers on which this data set resides. The volume serial numbers are not separated by commas.

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Displaying Detail and Performance Information

The following describes detail and performance data returned for non-VSAM and VSAM data sets.

Figure 7-25 shows an example of the Data Set Details panel containing data for a non-VSAM data set.

Figure 7-25 Data Set Details Panel: Non-VSAM Data Set

```
InTune ---------------------- Data Set Details -------------------------------
 COMMAND ===>                                                SCROLL ===> CSR

 DD-Name: BIGBLOCK                                          Profile: TUNCOB01

 Opened for: PUT LOCATE   Acc Meth: SAM       Concatenation count: 000

 Data Set Information for SYS98128.T211644.RA000.TUNCOB04.DOUT1.H --------------

 SMS--------------- Allocation -------------- Format ---------------------------
 DATACLAS: PSFILE   Unit:  EXTENDED  CYLINDER DS Org: PS   Rec Fm: F
 STORCLAS: PROD     Primary:            00000 Log Rec Len: 00000 Blk Size: 00000
 MGMTCLAS: PROD     Secondary:          00000 Buf Cnt: 000 Buf Size: 00000
                    Volume count:         000 Stripes: 001 Concat #: 000
                    Curr extent count:  00000 Compressed: YES

 Data Set Performance -----------------------
 Avg Resp Time:   000.0  Avg IOSQ Time: 000.0
 Active rate:     000.0  Avg Pend Time: 000.0
 Total EXCPs:   0000000  Avg Disc Time: 000.0
```

For field related information for the Allocation and Format sections, refer to Table 7-16. Table 7-17 contains field descriptions for the Data Set Performance fields section for non-VSAM data set.

Table 7-17 Data Set Details Panel Fields: Non-VSAM Data Set

Command	Description
SMS Fields	
DATACLAS	For Systems Managed data sets, this is a class of a named collection of data set and space attributes.
STORCLAS	For Systems Managed data sets, this is a class of a named collection of performance and device availability attributes

Table 7-17 Data Set Details Panel Fields: Non-VSAM Data Set

Command	Description
MGMTCLAS	For Systems Managed data sets, this is a class of a named collection of migration, backup, and expiration attributes
Data Set Performance Fields	
Avg Resp Time	Average data set response time during the monitoring interval.
Active Rate	The average number of I/Os per second being performed against the file during the monitoring interval.
Total EXCPs	The total number of EXCPs (I/Os) performed against the file during the monitoring period.
Total Conn Time	The total data set connect time during the monitoring interval. This is expressed in 128 milliseconds units. Includes data transfer time, connect search time, protocol, and reconnect time.
Avg IOSQ Time	Average IOS Queue Time experienced by the data set during the monitoring interval expressed in ms units. IOSQ TIME is computed using the formula: $$\text{Average IOS queue time} = \frac{(QC / S)}{R}$$ Where: • **QC** is the total number of requests found on the IOS queue • **S** is the total number of samples taken • **R** is the active rate
Avg Pend Time	The average number of milliseconds that an I/O request remains queued to the channel. This value reflects the amount of time that elapses between when the SSCH (Start SubChannel) function is accepted by the subchannel and when the first command associated with the SSCH function is accepted at the device. Pending time accrues when the request is waiting for an available channel path or control unit, as well as when shared DASD contention occurs.

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Table 7-17 Data Set Details Panel Fields: Non-VSAM Data Set

Command	Description
Avg Disc Time	The average number of milliseconds that the device had an active I/O request but was disconnected from the channel path. Disconnect time includes: • Time waiting to be reconnected after a SET SECTOR. This is called rotational position sensing (RPS) delay; • Head Movement time (SEEK TIME) between cylinders; • Latency or search time.
Avg Conn Time	The average number of milliseconds the device was connected to a channel path and actively transferring data between the device and central storage. This value is calculated as: Average Connect time = Total connect time / Measurement Even count.

Figure 7-26 shows an example of the Data Set Details panel containing data for a VSAM data set.

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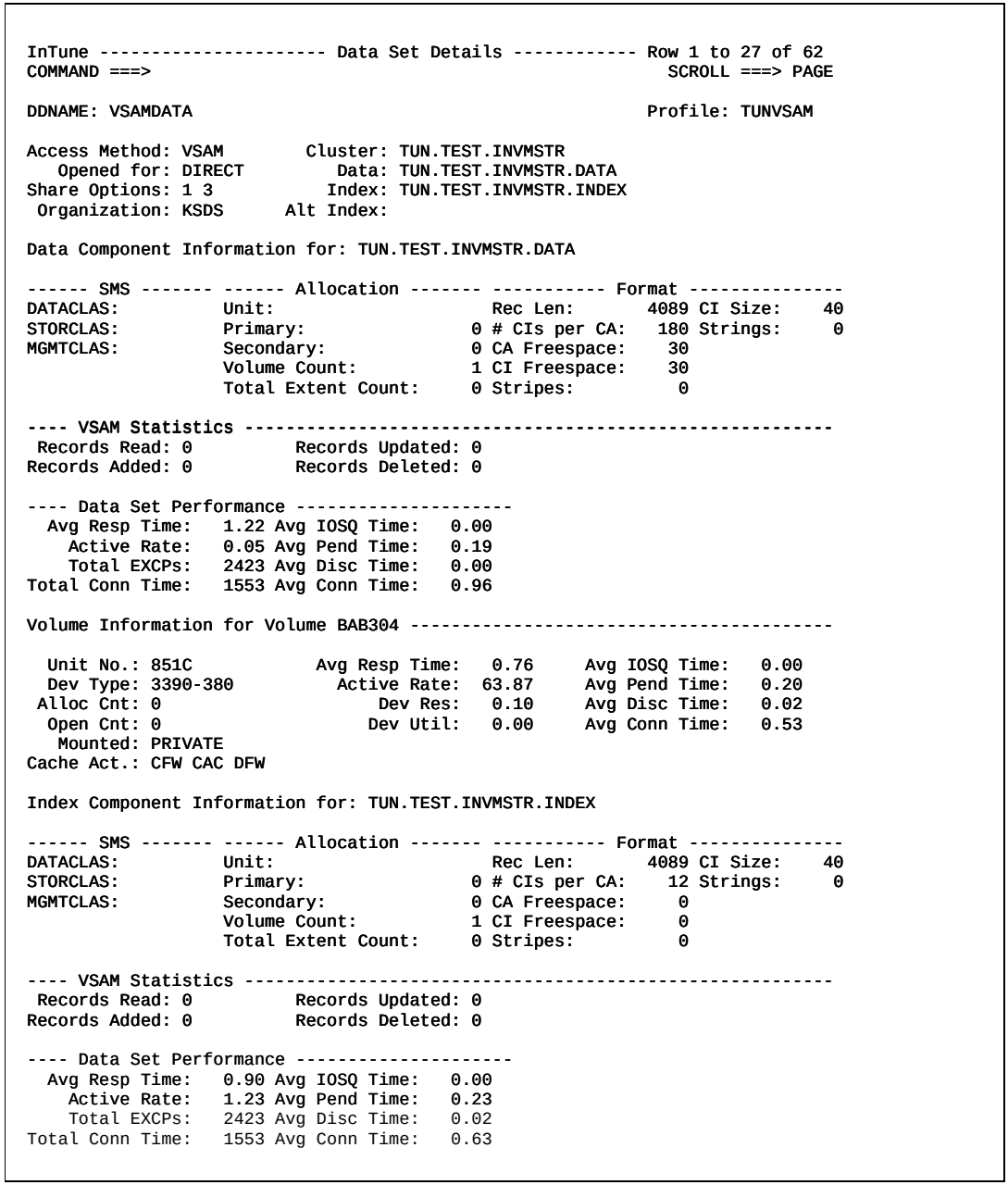
Figure 7-26 Data Set Details Panel: VSAM Data Set



```
InTune ---------------------- Data Set Details ------------ Row 1 to 27 of 62
COMMAND ===>                                                 SCROLL ===> PAGE

DDNAME: VSAMDATA                                            Profile: TUNVSAM

Access Method: VSAM        Cluster: TUN.TEST.INVMSTR
   Opened for: DIRECT          Data: TUN.TEST.INVMSTR.DATA
Share Options: 1 3            Index: TUN.TEST.INVMSTR.INDEX
 Organization: KSDS       Alt Index:

Data Component Information for: TUN.TEST.INVMSTR.DATA

------ SMS ------- ------ Allocation ------- ----------- Format ---------------
DATACLAS:          Unit:                      Rec Len:       4089 CI Size:    40
STORCLAS:          Primary:                0 # CIs per CA:   180 Strings:     0
MGMTCLAS:          Secondary:              0 CA Freespace:    30
                   Volume Count:           1 CI Freespace:    30
                   Total Extent Count:     0 Stripes:          0

---- VSAM Statistics -----------------------------------------------------------
 Records Read: 0          Records Updated: 0
Records Added: 0          Records Deleted: 0

---- Data Set Performance ---------------------
  Avg Resp Time:   1.22 Avg IOSQ Time:   0.00
    Active Rate:   0.05 Avg Pend Time:   0.19
    Total EXCPs:   2423 Avg Disc Time:   0.00
Total Conn Time:   1553 Avg Conn Time:   0.96

Volume Information for Volume BAB304 ----------------------------------------

  Unit No.: 851C            Avg Resp Time:   0.76     Avg IOSQ Time:   0.00
  Dev Type: 3390-380          Active Rate:  63.87     Avg Pend Time:   0.20
 Alloc Cnt: 0                     Dev Res:   0.10     Avg Disc Time:   0.02
  Open Cnt: 0                    Dev Util:   0.00     Avg Conn Time:   0.53
   Mounted: PRIVATE
Cache Act.: CFW CAC DFW

Index Component Information for: TUN.TEST.INVMSTR.INDEX

------ SMS ------- ------ Allocation ------- ----------- Format ---------------
DATACLAS:          Unit:                      Rec Len:       4089 CI Size:    40
STORCLAS:          Primary:                0 # CIs per CA:    12 Strings:     0
MGMTCLAS:          Secondary:              0 CA Freespace:     0
                   Volume Count:           1 CI Freespace:     0
                   Total Extent Count:     0 Stripes:          0

---- VSAM Statistics -----------------------------------------------------------
 Records Read: 0          Records Updated: 0
Records Added: 0          Records Deleted: 0

---- Data Set Performance ---------------------
  Avg Resp Time:   0.90 Avg IOSQ Time:   0.00
    Active Rate:   1.23 Avg Pend Time:   0.23
    Total EXCPs:   2423 Avg Disc Time:   0.02
Total Conn Time:   1553 Avg Conn Time:   0.63
```

Table 7-18 contains field descriptions for the Data Set Performance fields section for VSAM data set

Table 7-18 Data Set Performance Fields: VSAM Data Sets

Command	Description
Access Method	
Opened For	Intention of the program when performing I/Os for this data set. Valid values are: • READ • WRITE • DIRECT
Share Options	Displays two numeric values. The first value is the level (1, 2, 3, or 4) of cross-region sharing allowed by VSAM. The second value is the level (3 or 4 only) of cross system sharing allowed by VSAM. • At level 1, the data set can be shared by any number of users for read processing, or can be accessed by only one user for read and write. • At level 2, the data set can be accessed by any number of users for read processing, and can also be accessed by one user for write processing. • At level 3, the data set can be fully shared by any number of users. • At level 4, the data set can be fully shared by any number of users, and buffers used for direct processing are refreshed for each request.
Organization	Physical organization of the data stored in this data set. May be one of the following: • KSDS • ESDS • RRDS
Cluster	Full name of the data set. If this is a KSDS organization, InTune displays the names of the DATA and INDEX components.
Data	
Index	VSAM KSDS data sets are indexed using a multi-level structure. The number of levels can have an impact on the performance of the data set if there are insufficient index buffers.
Alt Index	
Format	
Rec Len	Specified length of the records residing in this data set.
Strings	Number of strings for the data set. This indicates the number of concurrent operations that may be started for the data set.

Table 7-18 Data Set Performance Fields: VSAM Data Sets

Command	Description
CI Size	Size of the control interval for the data in this data set.
CIs per CA	Count of CIs allocated within a control area for the data in this data set.
CA Freespace	Percentage of free space in the control area. Defined when the data set was created
CI Freespace	Percentage of free space in the control interval. Defined when the data set was created.
Stripes	For extended sequential data sets, the number of stripes used to read/write the data. This will be non-zero if allocated extended with multiple stripes.
VSAM Statistics	
Records Read	Total number of records retrieved during the monitored period.
Records Added	Total number of records added during the monitored period.
Records Updated	Total number of records written during the monitored period.
Records Deleted	Total number of records deleted during the monitored period.
CA Splits	Total number of control area splits that have occurred since the file was defined.
CI Splits	Total number of control interval splits that have occurred since the file was defined.
Data Set Performance Fields	
Avg Resp Time	Average data set response time during the monitoring interval.
Active Rate	The average number of I/Os per second being performed against the file during the monitoring interval.
Total EXCPs	The total number of EXCPs (I/Os) performed against the file during the monitoring period.
Total Conn Time	The total data set connect time during the monitoring interval. This is expressed in 128 milliseconds units. Includes data transfer time, connect search time, protocol, and reconnect time.

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Table 7-18 Data Set Performance Fields: VSAM Data Sets

Command	Description
Avg IOSQ Time	Average IOS Queue Time experienced by the data set during the monitoring interval expressed in ms units. IOSQ TIME is computed using the formula: $\text{Average IOS queue time} = \frac{(QC / S)}{R}$ Where: • QC is the total number of requests found on the IOS queue • S is the total number of samples taken • R is the active rate
Avg Pend Time	The average number of milliseconds that an I/O request remains queued to the channel. This value reflects the amount of time that elapses between when the SSCH (Start SubChannel) function is accepted by the subchannel and when the first command associated with the SSCH function is accepted at the device. Pending time accrues when the request is waiting for an available channel path or control unit, as well as when shared DASD contention occurs.
Avg Disc Time	The average number of milliseconds that the device had an active I/O request but was disconnected from the channel path. Disconnect time includes: • Time waiting to be reconnected after a SET SECTOR. This is called rotational position sensing (RPS) delay; • Head Movement time (SEEK TIME) between cylinders; • Latency or search time.
Avg Conn Time	The average number of milliseconds the device was connected to a channel path and actively transferring data between the device and central storage. This value is calculated as: Average Connect time = Total connect time / Measurement Even count.
Buffer Performance	
Pool ID	Pool identifier used to satisfy requests for this file.
Buffer Size	Size of the buffer used from the pool identified by ‘Pool ID’
Ratio	Percentage of READ requests that were satisfied from the buffer pool without an EXCP.
# of Buffers	Number of buffers available in the shared pool.
Steal Writer	Number of non user-initiated WRITES initiated for this buffer pool. This is usually a serious performance consideration. (LSR/GSR)

For either a non-VSAM or VSAM data set, you can scroll down to see additional volume information (Figure 7-27):

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Figure 7-27 Data Set Details Panel: Volume Information

```
Volume Information for Volume BAB304 ----------------------------------------
  Unit No.: 851C            Avg Resp Time:   0.76     Avg IOSQ Time:   0.00
  Dev Type: 3390-380          Active Rate:  63.87     Avg Pend Time:   0.20
 Alloc Cnt: 0                     Dev Res:   0.10     Avg Disc Time:   0.02
  Open Cnt: 0                    Dev Util:   0.00     Avg Conn Time:   0.53
   Mounted: PRIVATE
Cache Act.: CFW CAC DFW
```

Table 7-19 contains field descriptions for the Data Set Performance fields section for VSAM data set

Table 7-19 Data Set Details Fields: Volume Information

Command	Description
Volume Information Fields. These statistics are for the entire volume and not just for the data set. This way, you can use InTune to determine reasons for data sets not performing correctly and compare the performance of the data set with the entire volume.	
Volume	Volume serial name.
Unit Number	UCB Unit number (address).
Dev Type	Device Type.
Aloc Count	Number maximum number of users allocated to the volume during the monitoring period.
Open Count	The maximum number of open data sets on the volume during the monitoring period. The open count directly influences the IOS Queue time to the device.
Mounted	How the volume was mounted to OS/390. Can either be PRIVATE, PUBLIC, STORAGE. This is used to determine how data sets are allocated on the device.
Cache Act	Indicates active caching options for the device. If present, the option is active. The options are: • CFW Cache Fast-Write • CAC basic caching is active • DCP is active • DFW Device Fast Write is active for the device. • These options can greatly affect the performance of the volume.
Avg Resp Time	Average data set response time during the monitoring interval. This is in milliseconds units.
Active Rate	The average number of I/Os per second being performed against the volume during the monitoring interval.

Table 7-19 Data Set Details Fields: Volume Information

Command	Description
Dev Res	The average number of I/Os per second being performed against the volume during the monitoring interval.
Dev Util	Percentage the device was in use during the monitoring period. This includes both the time the device was performing I/O operations and the time that the device was reserved, but not necessarily active. The calculation is: Device Utilization Percentage = 100 * ((DCT +TDT / T) + (RS / S)) Where: • DCT: Is the device connect time. • TDT: Is the device disconnect time. • T: The length of the monitoring session. • RS: The number of times the devices was reserved but not busy. • S: The total number of samples
Avg IOSQ Time	Average IOS Queue Time experienced by the data set during the monitoring interval expressed in ms units. IOSQ TIME is computed using the formula: $\text{Average IOS queue time} = \frac{(QC / S)}{R}$ Where: • QC is the total number of requests found on the IOS queue • S is the total number of samples taken • R is the active rate
Avg Pend Time	The average number of milliseconds that an I/O request remains queued to the channel. This value reflects the amount of time that elapses between when the SSCH (Start SubChannel) function is accepted by the subchannel and when the first command associated with the SSCH function is accepted at the device. Pending time accrues when the request is waiting for an available channel path or control unit, as well as when shared DASD contention occurs.
Avg Disc Time	The average number of milliseconds that the device had an active I/O request but was disconnected from the channel path. Disconnect time includes: Time waiting to be reconnected after a SET SECTOR. This is called rotational position sensing (RPS) delay; Head Movement time (SEEK TIME) between cylinders; Latency or search time.
Avg Conn Time	The average number of milliseconds the device was connected to a channel path and actively transferring data between the device and central storage. This value is calculated as: Average Connect time = Total connect time / Measurement Even count.

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DD Names for IMS, DB2, Adabas, and CA-Datacom

If you are monitoring an IMS, DB2, Adabas, or CA-Datacom application, one of the rows contains a value in the DD name field that corresponds to the application. When you select this field, InTune displays a screen with more detailed information about that application.

Table 7-20 Application DD Names

For the application...	The DD name field contains...	Selecting this displays...	For more information, see...
DB2	.DB2	DB2 Statements	Chapter 13, “Using InTune in a DB2 Environment”
IMS	.IMS	IMS Statements	Chapter 15, “Using InTune in an IMS Environment”
Adabas	.Adabas	ADABAS Statements	Chapter 16, “Using InTune with a Non-IBM Database”
CA-Datacom	.DCOM	CA-DATACOM Statements	Chapter 16, “Using InTune with a Non-IBM Database”

Interactive Analysis Option 6 - TranView

TranView shows IMS or CICS activity in terms of individual transactions. It displays the percentage of time InTune detected activity for each transaction in the six major activity and delay categories. If you select a transaction, InTune recomputes the values using only samples from the selected transaction on all subsequent screens you display. This enables you to focus on the performance of that transaction.

For information on using the TranView display, see “Using TranView for CICS” on page 14-4.

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Figure 7-28 TranView Panel

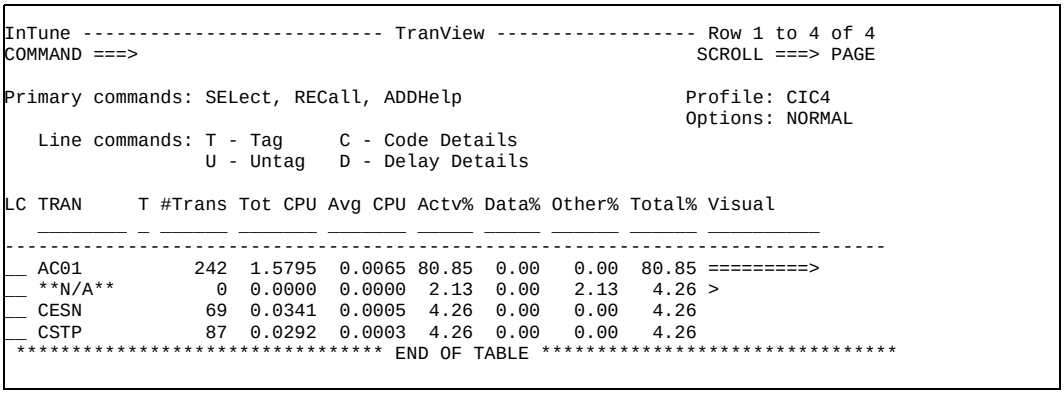

Table 7-21 describes the available commands for TranView.

Table 7-21 TranView Commands

Command	Description
SELect	Selects only the tagged transactions for analysis.
RECall	Reverses the effect of the SELect line command. This command recalls any excluded transactions.
ADDhelp	Invokes the Content-sensitive help application to update or create a help entry for the selected content.
T	Tag line command. Used to select up to five tasks for analysis.
U	Untag line command. Used to deselect a task.
C	CodeView Detail line command. Used to display the CodeView Detail panel showing activity detected by InTune. The CodeView Detail panel is described on page57.
D	DelayView Detail line command. Used to display the DelayView Detail panel showing the types of delays encountered by InTune. The DelayView Detail panel is described on page 58.

Table 7-22 provides a description for each field in TranView.

Table 7-22 TranView Fields

Field	Description
Profile	Name of the profile you specified when you created the monitor definition.
Options	Type of analysis in effect: NORMAL, ALL, ACTIVE, or WAIT. An asterisk (*) following the value indicates that tasks or transactions have been selected for analysis. Place the cursor on the Options field value and press Enter to display a pop-up window listing the selected tasks/transactions.
Tran	Name of a transaction detected by InTune during the monitoring of an IMS or CICS region. If a transaction name can not be identified, the value **n/a** is substituted.
T	“X” indicates the transaction has been tagged for analysis.
#Trans	Number of times the transaction completed during the monitored period.
Tot CPU	The cumulative CPU seconds for this transaction during the monitored period.
AVG CPU	Average CPU time required for this transaction during the monitored period.
Actv%	Percentage of time during the monitored period that the CPU was actively processing the monitored transaction.
Data%	Percentage of time during the monitored period that the transaction was delayed because of an I/O request.
Other%	Percentage of time during the monitored period that was not attributable to any of the categories known to InTune.
Totl%	Summation of the categories of delay.
Visual	Graphical representation of the total delay associated with the transaction.

CodeView Detail

Use the CodeView Detail (C) line command from the TranView panel to display the program activity associated with a specific task; see Figure 7-29.

Figure 7-29 CodeView Detail Panel from TranView

```
InTune -------------------- CodeView Detail ----------------- ROW 1 to 9 of 28
COMMAND ===>                                                  SCROLL ===> CSR

     Transaction: **N/A**                                   Profile: D241COB
                                                            Options: NORMAL
Primary commands: MOde Pseudo/Module/Csect/4GL,                Mode: CSECT
                  PSEudo, REGister, ADDHelp

   Line commands: A - Associate     C - Callerid     D - Delays
                  I - Info          L - Listing      S - Distribution
                  H - Histogram    NH - Normalized Histogram

LC Module   Csect    Csect Description         L C Actv% Wait% Totl% Visual
   --------- --------- ------------------------- - - ----- ----- ----- ----------
>-------------------------------------------------------------------------------
__ DSN8EAE1 DSN8EAE1                           B   13.56  0.00 13.56 =========>
__ DSNIDM   DSNISFS  Table scan to evaluate se A   11.86  0.00 11.86 =======>
__ DSNBBM   DSNB1GET Retrieve requeued page    A   10.17  0.00 10.17 ======>
__ DSNIDM   DSNIRCLS                           A    5.08  0.00  5.08 ==>
__ HASCHAM  HASCHAM                            B    0.00  3.39  3.39 =>
__ .XMS0077 DB2GDBM1                                3.39  0.00  3.39 =>
__ DSNECP10 DSNECP16 Perform run subcommand    B    1.69  1.69  3.39 =>
__ DSNIDM   DSNIELIK Evaluate like predicate   A    3.39  0.00  3.39 =>
__ DSNIDM   DSNIREDR Execute DB procedures     A    3.39  0.00  3.39 =>
```

This panel displays which modules and Csects delayed a task which is identified in the Task: field. The commands you can issue and field headings are identical to the CodeView panel (see page 31). All subsequent associated panels report information for the specified task.

Note

The CodeView Detail panel reports both Active and Wait activity percentages for Analyze Normal mode, to account for all activity reported in TaskView.

DelayView Detail

Use the DelayView Detail (D) line command to display the delay categories detected by InTune associated with a specific task; see Figure 7-6.

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Figure 7-30 DelayView Detail Panel

```
InTune ------------------- DelayView Detail ------------------ ROW 1 to 6 of 6
 COMMAND ===>                                                  SCROLL ===> CSR

      Transaction: **N/A**                                    Profile: D241COB
                                                              Detail: ON
Primary commands: DETail on/off,       Module: *
                  ADDHelp                Csect: *
                                       Offset: *
   Line commands: A - Address

LC Major category       Minor category       Actv% Wait% Totl% Visual
   ____________________ ____________________ _____ _____ _____ __________
--------------------------------------------------------------------------------
__ Data Delay           DB2 Statement        71.19  0.00 71.19 =========>
__ Program Active       Program Active        6.78  0.00  6.78
__ Other Delays         Waiting for CPU       0.00  3.39  3.39
__ Data Delay           IO Queued             0.00  1.69  1.69
__ File Mgmt Delay      Open J SVC            0.00  1.69  1.69
******************************** End of Table ********************************
```

This panel displays what caused a task to be delayed in its execution. The commands you can issue and field headings are identical to the DelayView panel (see page 20). All subsequent associated panels report information for the specified task.

Note

The Delay Detail panel does not support the S (Distribution) line command.

Interactive Analysis Option 7 - ModView

ModView displays the linkage editor map for all load modules located in the target address space. Only load module entries and those Csects with detected activity are listed. From ModView, you can hyperlink to module details or to a panel which suggests a linkage order for reducing system paging.

Figure 7-31 ModView Panel

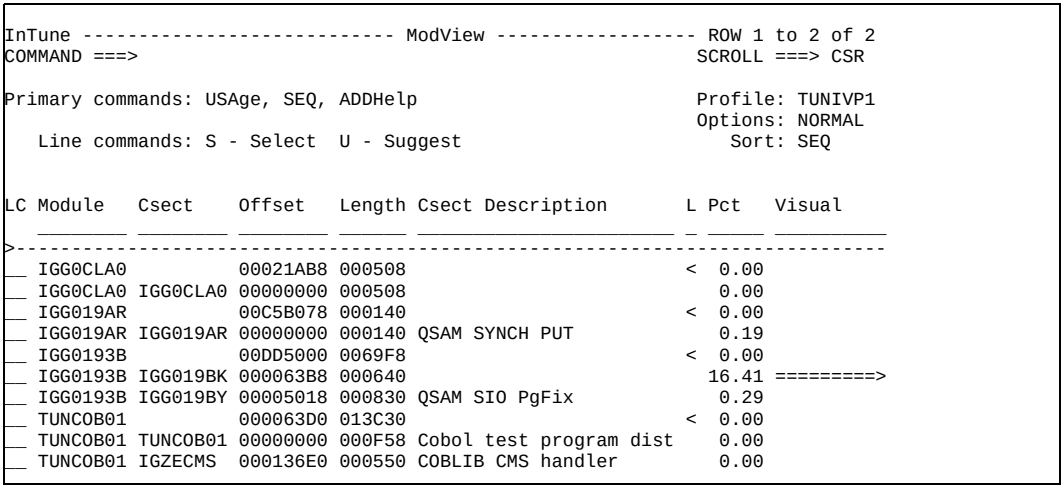

Table 7-23 describes the primary and line commands available for ModView.

Table 7-23 ModView Commands

Command	Description
USAge	Sorts the display by activity within a load module in descending order. Csects executed most within a load module are shown first.
SEQ	Sorts the display by Csect location within a load module in ascending order.
ADDHelp	Invokes the Content-sensitive help application to update or create a help entry for the selected content.
S	**Select -** Provides detailed information about the selected load module, such as the library from which it was loaded, the module load address, length, date of link edit, component identifier of linkage editor, and the data set of origin.
U	**Suggest -** Suggests an improved link order for the selected load module based upon the frequency of execution of its Csects during the monitored period.

Table 7-24 describes the fields in ModView.

Table 7-24 ModView Fields

Field Name	Value
Profile	Name of the profile you specified when you created the monitor definition.
Options	Type of analysis in effect: NORMAL, ALL, ACTIVE, or WAIT. An asterisk (*) following the value indicates that tasks or transactions have been selected for analysis. Place the cursor on the Options field value and press Enter to display a pop-up window listing the selected tasks/transactions.
Sort	Display mode (USAGE or SEQ).
Module	Name of the load module.
Csect	Name of the Csect within the load module.
Offset	For Modules, the hexadecimal address in virtual storage where the module was loaded. For Csects, the hexadecimal offset of the Csect within the module.
Length	Hexadecimal length of the module or the Csect.
Csect Description	Description of the Csect, if available.
L	Location of the module in virtual memory. **<** Indicates the module resides below the 16MB line. **>** Indicates the module resides above the 16MB line.
Pct	Percentage of the monitored period that InTune detected that this Csect was in use.
Visual	Visual representation of the Pct field.
Scroll right to display the following fields.	
Entry Type	The type of Module/Csect name. This may be the name of a pseudo Csect created by the linkage editor and compiler. This entry may be one of several types: • **CM** - Common code section • **ER** - Strong external reference • **LL** - Load module entry (versus an ESD entry) • **LR** - Label reference • **NU** - Null entry • **PC** - Private code section • **SD** - Code section • **WX** - Weak external reference

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Table 7-24 ModView Fields

Field Name	Value
Date Stamp	Linkage editor date in Julian format for the load module.
Processor ID	The component identifier of the translator that created the Csect, or the component identifier of the linkage editor that assembled the load module.
Processor Version	The component release of the translator that created the Csect.
AMODE	Addressing mode. The address length a program is prepared to handle upon entry. Valid addressing modes are: • **24** - 24-bit addressing • **31** - 31-bit addressing • **ANY** - Either 24-bit or 31-bit addressing
RMODE	Residence mode. Specifies where the module is to be loaded in virtual storage: • **24** - Indicates the module must be loaded within 24-bit addressable virtual storage below the 16-megabyte virtual storage line. • **Any** - Indicates the module may be loaded anywhere in virtual storage either above or below the 16-megabyte virtual storage line.
RN	Reentrant option. Displays Y if the module is link-edited with the reentrant option. Displays N if the module is not reentrant.
RU	Reusable option. Displays Y if the module is link-edited with the reusable option. Displays N if the module is not reusable.
OV	Overlay. Displays Y if the module is link-edited in the overlay format. Displays N if the module is not in the overlay format.
LD	Loadable. Displays Y if the module is loadable. Displays N if the module is not loadable.
EX	Executable. Displays Y if the module is executable. Displays N if the module is not executable.
Dataset	Data set from which the module was loaded.

Determining addressing mode (AMODE):

The loader determines the addressing mode for the entry point as follows:

- The default AMODE of 24 is assumed.

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- If the AMODE is specified in the ESD data for the entry point as an assembler statement, that specification replaces the default. The loader assigns the AMODE value from the control section or private code that contributes to the loaded module, ignoring identically named control sections and private code, which are replaced.

- If AMODE is specified as a parameter in the PARM field of the EXEC statement, that specification replaces the previously determined value.

Determining residence mode (RMODE):

The loader determines the residence mode for the loaded program as follows:

- The default RMODE of 24 is assumed.

- If the RMODE is specified in the ESD data for the first control section or private code which contributes to the loaded module as an assembler statement, that specification replaces the default.

- If the RMODE is specified as a parameter in the PARM field of the EXEC statement, that specification replaces the previously determined RMODE.

- If the ESD data for any subsequent control section or private code which contributes to the loaded module specifies an RMODE of 24, the RMODE for the entire module is reset to 24. If loading begins above the 16-megabyte virtual storage line on the basis of an early determination of RMODE=ANY, and the RMODE is later reset to 24, an error message is issued and loading is restarted below the 16-megabyte virtual storage line.

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Link Suggestions

To display the Link Suggestions panel (Figure 7-32), use the s**U**ggest line command for a module. This panel shows the suggested link order for a previously selected load module, based upon the execution frequency of its Csects during the measurement period. This suggestion minimizes paging and reduces the working set size required.

You may create linkage editor ORDER statements using the EXPORT command. These statements should be included in your linkage editor deck to gain improved performance. See “Saving the Information on a Panel” on page 4-26.

Figure 7-32 Link Suggestions Panel

```
InTune ----------------------- Link Suggestions ---------- ROW 49 to 72 of 111
COMMAND ===>                                                SCROLL ===> CSR

Primary Commands: ADDHelp                                   Profile: TUNIVP1
                                                             Module: TUNCOB01
Csect    Offset   Length   Pct   Visual
________ ________ ________ _____ __________
--------------------------------------------------------------------------------
IGZKGTM  00007EA0 00000000  0.00
IGZTRTX  00007EA0 00000000  0.00
ILBOCOM  00007EA0 00000000  0.00
IGZCBID  00007EA0 00000000  0.00
IGZEDBG  00007EA0 00000000  0.07
IGZEDBW  00007EA0 00000000  0.20
IGZESTA  00007EA0 00000648 22.23 =====>
TUNCOB01 000084E8 00000F20 35.35 =========>
IGZEDBR  00009408 00000000  7.48 =>
IGZEVOC  00009408 00000000  0.14
IGZENRT  00009408 00000C58  0.07
ILBOSTP0 0000A060 00000000  0.00
IGZTTCL  0000A060 00000000  0.00
IGZKTKN  0000A060 00000000  0.00
```

Table 7-25 describes the fields in the Link Suggestions panel.

Table 7-25 Link Suggestions Fields

Field Name	Value
Profile	Name of the profile you specified when you created the monitor definition.
Csect	Control section within the module and linked from a subroutine library. If Csect is blank, this is the entry for the load module.

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Table 7-25 Link Suggestions Fields

Field Name	Value
Offset	Hexadecimal offset within the Csect, or, if the Csect is not available, within the module.
Length	Hexadecimal length of the Csect or load module.
Pct	Percentage of time during the monitored period that this Csect was in use.
Visual	Graphical representation of the Pct field.

Interactive Analysis Option 8 - PoolView

PoolView displays statistics on IMS OSAM or VSAM/LSR and VSAM/GSR buffer pool usage. The PoolView panel (Figure 7-33) provides information about hit ratios, size and number of buffers, and total space requested. You can also display information about the data sets attached to a pool.

Note

If there is no pool data in the monitor data set, the PoolView option is not available.

Figure 7-33 PoolView for an IMS Environment

```
InTune -------------------- PoolView ------------------- ROW 1 TO 1 OF 1
COMMAND ===>                                            SCROLL ===> CSR

 Line Commands: S - Select                               Profile: IMS
                                                         Options: NORMAL
 LC Type Group Category
    ____ _____ ________________________________________
-------------------------------------------------------------------------------
 __ IMS  LSR   IMS VSAM local pools
 ******************************** END OF TABLE ********************************
```

For information on using PoolView with CICS, see “Using PoolView” on page 14-6. For information on using PoolView with IMS, see “Analyzing IMS Batch Performance Information” on page 15-7.

Table 7-26 describes each field in PoolView.

Table 7-26 PoolView Fields

Statement	Description
Profile	Name of the profile you specified when you created the monitor definition.
Options	Type of analysis in effect: NORMAL, ALL, ACTIVE, or WAIT. An asterisk (*) following the value indicates that tasks or transactions have been selected for analysis. Place the cursor on the Options field value and press Enter to display a pop-up window listing the selected tasks/transactions.
Type	Type of the pool, either IMS or VSAM.
Group	Defines the group as LSR, GSR, or OSAM. LSR refers to VSAM Local Shared Resources where the buffer pool is maintained in the user’s storage (PRIVATE). GSR refers to VSAM Global Shared Resources where the buffer pool is maintained in OS/390 common storage (ECSA). OSAM is the IMS Overflow Specific Access Method.
Category	Literal name of the pool.

What Next?

Now that you have used some of InTune’s Interactive Analysis panels, you can find specific information about InTune’s other features in the chapters listed in the following table.

To...	See...
Look at an example using the InTune demonstration program	Chapter 8, “Working with Interactive Analysis - A Demonstration”
Learn how to get the most out of InTune	Chapter 9, “Using InTune’s Additional Features”
Invoke monitors from outside the InTune TSO Client	Chapter 10, “InTune Open Application Program Interface”

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To...	See...
Create a set of batch reports	Chapter 11, “Generating InTune Batch Reports”
Look up delay categories and determine reasons for specific types of delays	Chapter 12, “Using InTune to Tune Your Application”
Use InTune with DB2	Chapter 13, “Using InTune in a DB2 Environment”
Use InTune with CICS	Chapter 14, “Using InTune in a CICS Environment” on page 1
Use InTune with IMS	Chapter 15, “Using InTune in an IMS Environment”
Use InTune with Adabas, Natural, or CA-Datacom	Chapter 16, “Using InTune with a Non-IBM Database”

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8

Working with Interactive Analysis - A Demonstration

This chapter describes how to use the Interactive Analysis Facility to analyze the data collected during a monitor session. The following tasks are described:

Using the Demonstration Program 8-2
Starting Interactive Analysis 8-2
Using the Monitor Overview Report 8-3
Using DelayView to Locate Program Delays. 8-6
Displaying Delayed Resources. 8-8
Using CodeView to Analyze Program Activity 8-15

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Using the Demonstration Program

The demonstration program TUNCOB01 is used to illustrate each option. The sample data provides you with an overview of the flexibility and usefulness of InTune. This program is the same as the program used for the Installation Verification Procedure (IVP).

If you want to follow along with the examples, use the data set created during the IVP. If the data set is not available, run the demonstration program as described in “Verifying the Installation and Operation of InTune” on page 2-56.

Starting Interactive Analysis

1. Select Option 1 from the Primary Option Menu.

   The Monitor Definition panel (Figure 8-1) is displayed:

Figure 8-1 Monitor Definition Panel

```
InTune ------------------ Monitor Definition -------------- ROW 1 to 5 of 5
COMMAND ===>                                                 SCROLL ===> CSR

Primary commands: ADD xxxx, STAtus                          Server ID: INTUNE
                                                               Status: ACTIVE
Line commands: S - Select       A  - Analyze Normal
               I - Invoke       AL - Analyze All          D  - Delete
               H - History      AA - Analyze Active       DD - Delete w/dsns
               C - Copy         AW - Analyze Wait         B  - Batch Reports

LC Profile  Description               Userid   Status     Date        Time
   ________ ____________________________ ________ __________ ___________ ________
>-------------------------------------------------------------------------------
__ DB2LDIST                           ABCDEF1  Inactive   1998/09/25  14:48:17
__ IMSIR21                            ABCDEF1  Inactive   1998/12/16  13:09:09
__ IMS41Y                             ABCDEF1  Inactive   1998/12/22  13:34:51
A_ TUNIVP1                            ABCDEF1  Inactive   1998/12/29  15:38:27
__ XTSTITUN                           ABCDEF1  Inactive   1998/11/03  14:01:58
```

2. Type A in the LC field next to the TUNIVP1 profile.

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3. Press **Enter**.

The Interactive Analysis menu (Figure 8-2) is displayed:

Figure 8-2 Interactive Analysis Menu

```
InTune --------------------- Interactive Analysis ----------------------------
OPTION  ===>

Enter option to analyze monitored job step:                 Profile: TUNIVP1
                                                            Options: NORMAL

          0  OverView   - View monitor session information
          1  TaskView   - Activity by task
          2  DelayView  - Program delays
          3  CodeView   - Program activity
          4  TimeView   - Samples by time
          5  DataView   - Dataset information
          6  TranView   - Activity by transaction
          7  ModView    - Module layout
          8  PoolView   - Buffer pools


Press END to return to Monitor Definition panel
```

Using the Monitor Overview Report

To view the Monitor Overview report, select Option 0. The Monitor Overview panel is displayed:

Figure 8-3 Monitor OverView Report for TUNIVP1

```
InTune ---------------------- Monitor OverView ------------ ROW 1 to 28 of 57
COMMAND ===>                                                SCROLL ===> CSR
                                                            Profile: TUNIVP1
                                                            Options: NORMAL
Sampler Statistics
--------------------------------------------------------------------------------
Monitor Data Set:  TUN21.ABCDEF.TUNIVP1.D981229.T153826
Final Rate:        10Msec   Start Date: 1998/12/29     CICS Lvl: **N/A**
Samples:             3208   Start Time: 15:39:10       DB2 Lvl:  **N/A**
Sample Balance:      0.88   Elapsed:    00:00:36       IMS Lvl:  **N/A**

Job Statistics                                         System Statistics
-----------------------------------------------        -----------------------
Jobname:   TUNIVP1          TCB Time:    18.55         MVS Lvl:   SP6.0.3
Stepname:  IVP              SRB Time:     1.95         CPU Type:  9672
Procstep:                   Active%:     57.48         CPU Model: 15
Program:   TUNCOB01         Wait%:        6.60         Serial:    01317
ASID:      007A (122)       Swapped%:     0.00         SMFID:     SYSD
User ID:   ABCDEF1          NonDisp%:     5.92
Job ID:    JOB06992         ProcDly%:    29.95
                            <Storage:   92.00K
EXCP-Cnt:  3154             >Storage:   4.000K
SIO-Rate:  86.26            Page-Sec:     0.00
                            Page-In:         0

Resource Demand Chart
--------------------------------------------------------------------------------
Resource   Type ----1----2----3----4----5----6----7----8----9----0
TUNCOB01   CPU  5686657656356575558586887666767142545787655267767 3
BIGBLOCK   I/O  ..................................................
UNBLOCK    I/O  ..11.1.1.1.1.....11.1....1...........1111...1...1.
Sampler Messages
--------------------------------------------------------------------------------
+-------------------------------------------------+
TN0495I InTune ECSA packet initialized at 0FF1D000
TN0101I Profile: TUNIVP1  now sampling JOB: TUNIVP1  PGM: TUNCOB01
TN0102I Profile: TUNIVP1  USERID: ABCDEF1  Data set:
        TUN21.ABCDEF.TUNIVP1.D981229.T153826
```

The Monitor OverView report (Figure 8-3) provides a broad range of information about the monitor session. You can use the information provided in the report to determine where to go next in your investigation of program delays, as well as verifying that the sample data is accurate.

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Checking the Validity of the Sample Data

Looking at the report for TUNIVP1, check the following items:

Samples

The number of samples is 3208. This is an acceptable number and typical for the TUNIVP1 program.

Sample Balance

The ratio of measured CPU time to sampled CPU time is 0.88, indicating an accurate sample data set.

Elapsed

The total length of the session was 36 seconds. After investigating and correcting the causes of program delays, we will look at this number again to notice the improvement.

Investigating Delays

Compare the Active% and Wait% fields. They show that the program was using CPU for a majority of the samples, 57.48 percent of the time. The 6.60 percent of samples where the program was not using CPU indicates that you should focus on program activity to get the most out of your tuning effort.

Because you are looking at program activity, the Resource Demand Chart will give a good indication of which tasks are using the majority of the CPU time. The first resource listed is TUNCOB01, which is the name of the demonstration program. To find delays associated with the TUNCOB01 program, use the CodeView option. We will look at this on page 15.

The next two resources are BIGBLOCK and UNBLOCK, which are data sets used by TUNCOB01 to read and write data. UNBLOCK uses more CPU compared to BIGBLOCK. To find out why, use the DelayView option, as demonstrated below.

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Using DelayView to Locate Program Delays

1. To select DelayView, type 2 on the OPTION line.

2. Press **Enter**.

   The DelayView panel (Figure 8-4) is displayed:

Figure 8-4 DelayView Panel

```
InTune --------------------------- DelayView ----------------- ROW 1 to 6 of 6
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: DETail on/off           Module: *          Profile: TUNIVP1
                  ADDHelp                  Csect: *          Options: NORMAL
                                          Offset: *           Detail: ON
   Line commands: A - Address
                  S - Distribution

LC Major category       Minor category       Actv% Wait% Totl% Visual
   ____________________ ____________________ _____ _____ _____ __________
-------------------------------------------------------------------------------
__ Program Active       Program Active       56.08  0.00 56.08 =========>
__ Other Delays         Waiting for CPU       0.00 35.88 35.88 =====>
__ Data Delay           IO Queued             0.00  4.21  4.21
__ File Mgmt Delay      Eov SVC               0.47  1.09  1.56
__ Voluntary Wait       Wait/Waitr SVC        0.00  1.31  1.31
__ Data Delay           Excpvr SVC            0.90  0.00  0.90
```

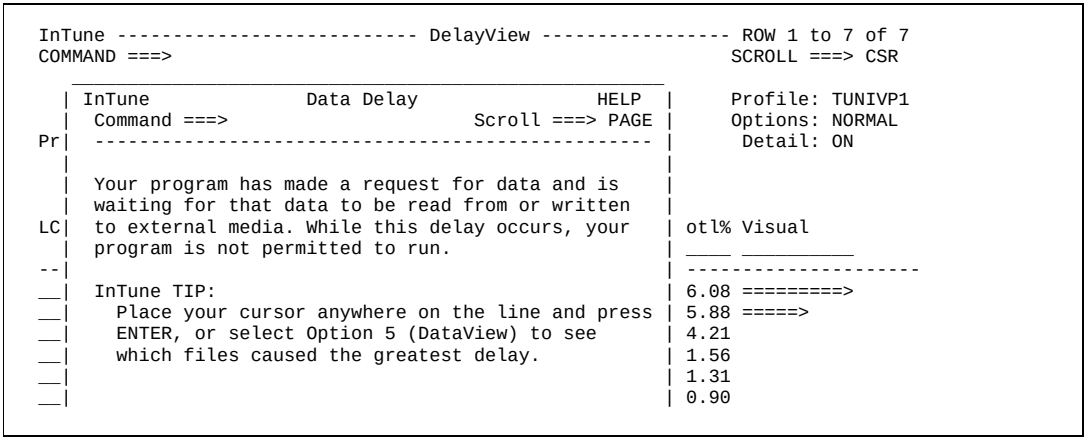
The largest and most significant delay is displayed first. In Figure 8-4, the first category is Program Active, indicating that the program was using CPU during 56.08 percent of the samples taken by InTune.

The second largest category, Other Delays, indicates that the program was delayed for 35.88 percent of the monitored period because of waiting for a CPU.

Displaying Content-sensitive Help

You can display help information specific to each delay category by placing the cursor on a category and pressing **PF1**. The following is an example for the Data Delay category:

Figure 8-5 DelayView Panel



You may edit or add help information. Refer to “Updating Content-Sensitive Help” on page 9-20 for complete information.

Displaying Delay Locations

To find the location of a specific delay, type A next to the Data Delay line on the DelayView panel (Figure 8-4 on page 8-6) and press **Enter**.

The Delay Locations panel (Figure 8-6) is displayed:

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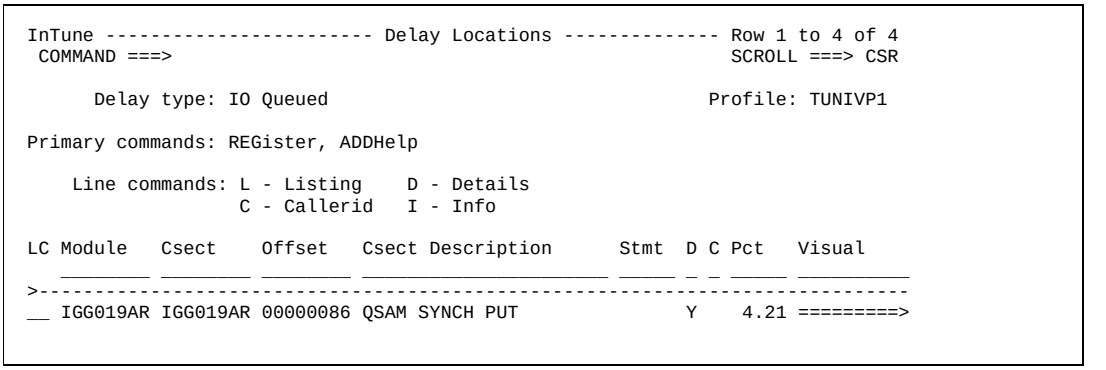
Figure 8-6 Delay Locations Panel



The Delay Locations panel displays a list of module names, Csects, and offsets where the delays were detected. If InTune finds more than one location where a data delay took place, the data is listed in order of decreasing significance. This example shows that the application waited within IGG019AR at offset 86.

Displaying Delayed Resources

If there is a Y in the D column on the Delay Locations panel, you can view another level of information. Type D for offset 86 and press **Enter**.

The Delayed Resources panel (Figure 8-7) is displayed:

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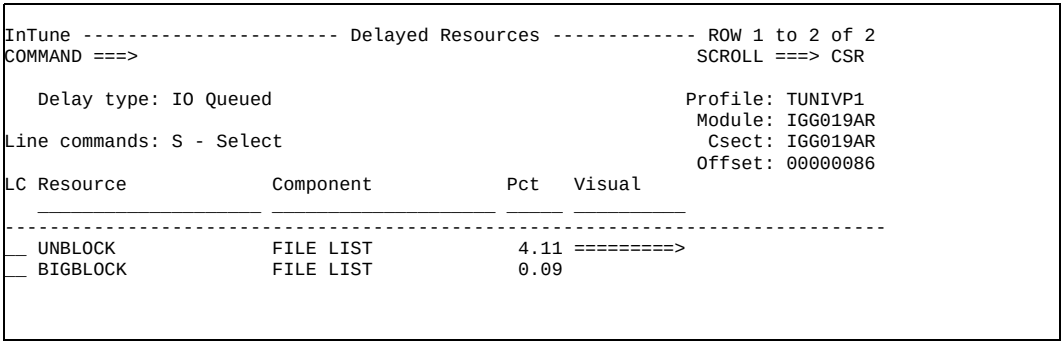
Figure 8-7 Delayed Resources Panel



The Delayed Resources panel shows resources and components related to a delay. Based on the type of delay, the Resource field contains different types of information. Figure 8-7 shows that two files, UNBLOCK and BIGBLOCK, are responsible for the Data Delay experienced in module IGG019AR. UNBLOCK shows a much higher delay than BIGBLOCK. This type of delay may be caused by factors such as block size, data set placement, and use of buffers.

Display UNBLOCK's Data Set Details

To investigate the delay caused by UNBLOCK, type S for UNBLOCK on the Delayed Resources panel (Figure 8-7) and press **Enter**.

The Dataset Details panel (Figure 8-8) is displayed:

Figure 8-8 Dataset Details Panel (for UNBLOCK)

```
InTune ---------------------- Data Set Details ------------ Row 1 to 27 of 30
COMMAND ===>                                                 SCROLL ===> PAGE

DDNAME: UNBLOCK                                             Profile: TUNIVP1

Opened for: PUT LOCATE    Access Method: SAM   Concatenation Count: 0

Data Set Information for: SYS00200.T121424.RA000.TUNIVP1.DOUT3.H04

               File Type: Physical Sequential
             Description: Fixed

------ SMS ------- ------ Allocation ------- ----------- Format ---------------
DATACLAS:          Unit:                 CYL DS Org:         PS Rec FM:      FB
STORCLAS:          Primary:                2 Log Rec Len:   200 Blk Size:   200
MGMTCLAS:          Secondary:              1 Buffer Count:    5 Buf Size:     0
                   Volume Count:           1 Stripes:         0 Concat #:     0
                   Curr Extent Count:      1

          ---------------- Data Set Performance -----------------
            Avg Response Time:       1.89  Avg IOSQ Time:   0.00
                  Active Rate:      68.50  Avg Pend Time:   0.20
                  Total EXCPs:        615  Avg Disc Time:   0.03
           Total Connect Time:     421.50  Avg Conn Time:   1.54

Volume Information for Volume PUBA01 ----------------------------------------

  Unit No.: 8359            Avg Resp Time:   1.72     Avg IOSQ Time:   0.00
  Dev Type: 3390-380          Active Rate:  72.00     Avg Pend Time:   0.20
 Alloc Cnt: 0                     Dev Res:   0.00     Avg Disc Time:   0.03
  Open Cnt: 0                    Dev Util:   0.00     Avg Conn Time:   1.50
   Mounted: PUBLIC
Cache Act.: CFW CAC DFW

****************************** End of Report ******************************
```

Note the following for UNBLOCK, shown in Figure 8-8:

- The Logical Record Length is 200 and the Block Size is 200.
- The data set referred to by UNBLOCK required 68.5 I/Os per second during the monitored period (the Active Rate).

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To see why BIGBLOCK's delay was so much less than UNBLOCK's, compare the two.

Compare BIGBLOCK with UNBLOCK

1. Press **End** to display the Delayed Resources panel (Figure 8-7).

2. Type S for the BIGBLOCK resource and press **Enter**.

The Dataset Details panel for BIGBLOCK (Figure 8-9 on page 8-11) is displayed:

Figure 8-9 Dataset Details Panel (for BIGBLOCK)

```
InTune ---------------------- Data Set Details ------------ Row 1 to 27 of 30
COMMAND ===>                                                 SCROLL ===> PAGE

DDNAME: BIGBLOCK                                           Profile: TUNIVP1

Opened for:               Access Method: NONE  Concatenation Count: 0

Data Set Information for: SYS00200.T121424.RA000.TUNIVP1.DOUT1.H04

              File Type: Physical Sequential
            Description: Fixed

------ SMS ------- ------ Allocation ------- ----------- Format ---------------
DATACLAS:          Unit:                 CYL DS Org:         PS Rec FM:      FB
STORCLAS:          Primary:                2 Log Rec Len:     0 Blk Size:     0
MGMTCLAS:          Secondary:              1 Buffer Count:    0 Buf Size:     0
                   Volume Count:           1 Stripes:         0 Concat #:     0
                   Curr Extent Count:      0

          ---------------- Data Set Performance -----------------
            Avg Response Time:       4.10  Avg IOSQ Time:   0.00
                  Active Rate:       1.75  Avg Pend Time:   0.18
                  Total EXCPs:         60  Avg Disc Time:   0.02
           Total Connect Time:      27.26  Avg Conn Time:   3.89

Volume Information for Volume PUBBC1 ----------------------------------------

  Unit No.: 8396            Avg Resp Time:   4.10     Avg IOSQ Time:   0.00
  Dev Type: 3390-380          Active Rate:   1.75     Avg Pend Time:   0.18
 Alloc Cnt: 0                     Dev Res:   0.00     Avg Disc Time:   0.02
  Open Cnt: 0                    Dev Util:   0.01     Avg Conn Time:   3.89
   Mounted: PUBLIC
Cache Act.: CFW CAC DFW
******************************** End of Report ********************************
```

Note the following for BIGBLOCK:

- The Logical Record Length is 200 and the Block Size is 8000.
- The data set referred to by BIGBLOCK required only 1.75 I/Os per second during the monitored period.

Notice that the Block Size of BIGBLOCK is much larger than the UNBLOCK Block Size. Consequently, the number of I/Os for BIGBLOCK is only a fraction of the I/Os completed for the UNBLOCK file.

Change the Block Size

The program TUNCOB01 wrote the same number of records to the UNBLOCK and BIGBLOCK files. This example shows a dramatic performance difference between the UNBLOCK and BIGBLOCK files that is directly related to their blocking factors. Generally, large block sizes provide better performance. To change the block size:

1. Invoke a monitor for profile TUNIVP1.

2. Change the block size specified in *hilevel*.BBSAMP member TUNIVP1 from 200 to 4000, as shown:

Example

```
//UNBLOCK  DD  DSN=&DOUT3,UNIT=SYSDA,
//             SPACE=(CYL,(2,1)),DISP=(,DELETE),
//             DCB=(RECFM=FB,LRECL=200,BLKSIZE=4000)
```

3. Submit the JCL. InTune will begin to monitor the program.

4. When the monitor session is complete, repeat the analysis as described above.

DelayView (Figure 8-10) shows that the delay associated with IO Queued has decreased from 4.21 percent to 0.48 percent.

Figure 8-10 DelayView Panel (after changing block size)

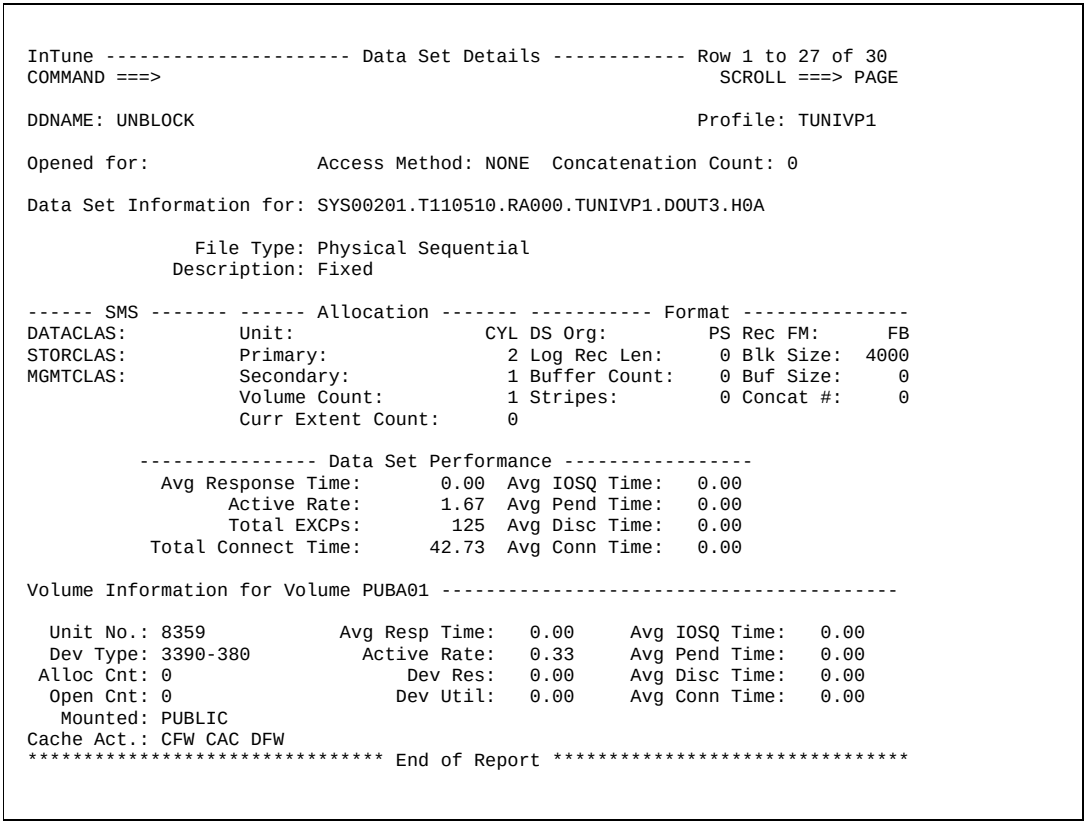
```
InTune --------------------------- DelayView ----------------- ROW 1 to 6 of 6
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: DETail on/off           Module: *          Profile: TUNIVP1
                  ADDHelp                  Csect: *          Options: NORMAL
                                          Offset: *           Detail: ON
   Line commands: A - Address
                  S - Distribution

LC Major category       Minor category       Actv% Wait% Totl% Visual
   -------------------- -------------------- ----- ----- ----- ----------
--------------------------------------------------------------------------------
__ Other Delays         Waiting for CPU       0.00 50.24 50.24 =========>
__ Program Active       Program Active       49.25  0.00 49.25 ========>
__ Data Delay           IO Queued             0.00  0.48  0.48
__ Voluntary Wait       Wait/Waitr SVC        0.00  0.03  0.03
```

Looking at the Dataset Details panel (Figure 8-11), the number of I/Os per second has gone from 68.5 to 1.67, with a corresponding connect time down from 421.50 ms to 42.73 ms.

Figure 8-11 Dataset Details Panel (after changing block size)



```
InTune ---------------------- Data Set Details ------------ Row 1 to 27 of 30
COMMAND ===>                                                  SCROLL ===> PAGE

DDNAME: UNBLOCK                                             Profile: TUNIVP1

Opened for:               Access Method: NONE  Concatenation Count: 0

Data Set Information for: SYS00201.T110510.RA000.TUNIVP1.DOUT3.H0A

              File Type: Physical Sequential
            Description: Fixed

------ SMS ------- ------ Allocation ------- ----------- Format ---------------
DATACLAS:          Unit:                 CYL DS Org:         PS Rec FM:      FB
STORCLAS:          Primary:                2 Log Rec Len:     0 Blk Size:  4000
MGMTCLAS:          Secondary:              1 Buffer Count:    0 Buf Size:     0
                   Volume Count:           1 Stripes:         0 Concat #:     0
                   Curr Extent Count:      0

          ---------------- Data Set Performance -----------------
            Avg Response Time:       0.00  Avg IOSQ Time:   0.00
                  Active Rate:       1.67  Avg Pend Time:   0.00
                  Total EXCPs:        125  Avg Disc Time:   0.00
           Total Connect Time:      42.73  Avg Conn Time:   0.00

Volume Information for Volume PUBA01 ----------------------------------------

  Unit No.: 8359            Avg Resp Time:   0.00     Avg IOSQ Time:   0.00
  Dev Type: 3390-380          Active Rate:   0.33     Avg Pend Time:   0.00
 Alloc Cnt: 0                     Dev Res:   0.00     Avg Disc Time:   0.00
  Open Cnt: 0                    Dev Util:   0.00     Avg Conn Time:   0.00
   Mounted: PUBLIC
Cache Act.: CFW CAC DFW
******************************** End of Report ********************************
```

Using CodeView to Analyze Program Activity

CodeView displays information from the perspective of the monitored program. Select Option 3 from the Interactive Analysis menu.

The CodeView panel (Figure 8-12) is displayed:

Figure 8-12 CodeView Panel Showing Csects with Activity

```
InTune --------------------------- CodeView ------------------ ROW 1 to 8 of 8
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: MOde Pseudo/Module/Csect/4GL,              Profile: TUNIVP1
                  PSEudo, REGister, ADDHelp                  Options: NORMAL
                                                                Mode: CSECT
Line commands: A - Associate     C - Callerid     D - Delays
               I - Info          L - Listing      S - Distribution
               H - Histogram    NH - Normalized Histogram
                                                                      Over
LC Module   Csect    Csect Description         L C Actv% Visual     Lap%
   ________ ________ ________________________ _ _ _____ __________ ____
>-------------------------------------------------------------------------------
__ TUNCOB01 TUNCOB01 Cobol test program distri < Y 53.03 ====>      0.06
__ TUNCOB01 IGZCIN1  INSPECT library subroutin <   42.28 ===>       0.19
__ IGG0193B IGG019TV QSAM EOB I/O DASD         <    1.75            0.64
__ IGG019AR IGG019AR QSAM SYNCH PUT            <    1.59            0.06
__ .USER    .USER    In user space               Y  1.11            0.00
__ .NUCLEUS IEC0SCR1                           <    0.08            0.00
__ IGG05530 IGG0553E                           <    0.08            0.00
```

Adding a Csect Description

Each row on the CodeView panel contains a unique identifier from the Module and Csect fields, as well as a Csect description, if one is available. You may edit or add a Csect Description using the **A**ssociate line command.

To edit the Csect description for the TUNCOB01 Csect:

1. Type A next to the TUBCOB01 module.

2. Press **Enter**.

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The Csect Associations window (Figure 8-13) is displayed:

Figure 8-13 Csect Associations Window

```
InTune --------------------- Csect Associations --------------------------
COMMAND ===>

       Csect ===> TUNCOB01

 Description ===> Cobol test program distributed with InTune

 Update Help ===> NO  (Yes or No)

Press ENTER to save; enter END to cancel
```

3. Change the Csect description.

4. Press **Enter** to return to the CodeView panel.

Note

You may only update Help information for user-written help. Refer to “Adding Csect Descriptions” on page 9-13 and “Updating Content-Sensitive Help” on page 9-20 for more information.

Example: Analyzing Program Activity

In Figure 8-12 on page 8-15 the majority of the delay is caused by two components:

- TUNCOB01/TUNCOB01
- TUNCOB01/IGZCIN1

Begin by looking at the TUNCOB01 Csect. The IGZCINI Csect is analyzed on page 21.

Display Activity Locations

To view activity locations in TUNCOB01:

1. Type H next to the TUNCOB01 Csect.

2. Press **Enter**.

The Histogram panel (Figure 8-14) is displayed:

Figure 8-14 Histogram Panel Showing TUNCOB01 Csect

```
InTune --------------------------- Histogram --------------- ROW 1 to 12 of 18
COMMAND ===>                                                  SCROLL ===> CSR

  Group ===> 32     (Group size in bytes or STMT)            Profile: TUNIVP1
                                                           Normalized: NO
Primary commands: REGister, ADDHelp                       Module name: TUNCOB01

   Line commands: D - Delays  L - Listing

LC Csect    Offset   Length Actv% Visual
   ________ ________ ______ _____ __________
-------------------------------------------------------------------------------
__ TUNCOB01 00000000   1696  0.00
__          000006A0     32  0.06
__          000006C0     32  0.03
__          000006E0     32  0.06
__          00000700     32  0.06
__          00000720     64  0.00
__          00000760     32  0.06
__          00000780     32  0.00
__          000007A0     32  0.03
__          000007C0     64  0.00
__          00000800     32  6.33  ====>
__          00000820     32 11.69  ==========>
__          00000840     32  8.64  ======>
__          00000860     32  0.37
__          00000880     32  0.17
__          000008A0     32  0.40
```

The Histogram panel shows Histogram divides a Csect into segments and displays the activity detected in each segment. By registering the program listings with InTune you can show statement numbers and verbs instead of Csects and offsets.

Registering the Program

To register a program, you must compile the program with the options listed in Table 9-8, “Compiler Options Required for Program Registration,” on page 9-35. Once this is done, you can register the program with InTune.

1. In the COMMAND field of the Histogram panel, type REGister.

2. Press **Enter**.

   The Program Listing Registration panel (Figure 8-15) is displayed:

Figure 8-15 Program Listing Registration Panel

```
InTune ----------------- Program Listing Registration -----------------------
OPTION  ===>

   A  ASM       - Assembler listings
   C  COBOL     - ANS and COBOL II listings
   P  PL/I      - IBM optimizing PL/I listings
   F  Fortran   - VS Fortran listings
   C1 IBM C/C++ - IBM C/C++ with Language Environment
   C2 SAS C     - SAS C listings

   Listing manager ===> PDS       (PDs, DDio, PAnvalet, or LIbrarian)


Enter an option or press END to exit
```

3. Register the COBOL program:

   - Select the C (COBOL) option.

   - Perform the program registration procedure explained in “Registering Source Program Listings” on page 9-34.

   - Press **End** to return to the Histogram panel (Figure 8-16), where the statement numbers and verbs are now displayed.

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Figure 8-16 Histogram Panel with Statement Numbers

```
InTune --------------------------- Histogram --------------- ROW 1 to 12 of 18
COMMAND ===>                                                  SCROLL ===> CSR

  Group ===> STMT   (Group size in bytes or STMT)            Profile: TUNIVP1
                                                           Normalized: NO
Primary commands: REGister, ADDHelp                       Module name: TUNCOB01

   Line commands: D - Delays  L - Listing

LC Csect    Stmt   Verb         Actv% Visual
   ________ ______ ____________ _____ __________
------------------------------------------------------------------------------
__ TUNCOB01    100 PERFORM       0.08
__             101 PERFORM       0.11
__             119 ADD           0.03
__             120 ADD           0.03
__             131 WRITE         0.03
__             141 ADD          11.83 =========>
__             142 ADD           7.60 =====>
__             143 IF            2.94 =>
__             143 GO            2.01 >
__             144 MOVE          2.29 >
__             151 MOVE          0.25
__             152 INSPECT       0.23
```

4. To view the source statement associated with the greatest amount of activity, type L in the LC field of the statement number with the largest visual delay.

5. Press **Enter**.

   The COBOL listing for TUNCOB01 is displayed using ISPF Browse (see Figure 8-17 on page 8-20).

Figure 8-17 TUNCOB01 Listing

```
BROWSE - BB.XTSTI.COBLIST(TUNCOB01) ---------------- LINE 00000181 COL 001 080
COMMAND ===>                                                 SCROLL ===> PAGE
 000135         010620
 000136         010630*-------------------------------------------------------
 000137         010640*  SUBSCRIPTING
 000138         010650*-------------------------------------------------------
 000139         010660
 000140         010670  SUBSCRIPT2-100.
 000141         010680     ADD RECORD-00 (SUB) TO RECORDB-00 (SUB).
 000142         010690     ADD 1 TO SUB.
 000143         010691     IF SUB LESS THAN 6 GO TO SUBSCRIPT2-100.
 000144         010692     MOVE 1 TO SUB.
 000145         010700
 000146         010800*-------------------------------------------------------
 000147         010900*  INSPECT
 000148         011000*-------------------------------------------------------
 000149         011100
 000150         011110  INSPECT-100.
 000151         011200     MOVE    "THIS IS SOME DATA" TO DATA-CONST1.
```

The line containing the selected statement number is highlighted and positioned in the center of the screen. This statement is in the middle of a small subroutine that performs a COBOL subscripting operation. The likely problem is that the subscripting operation could be coded more efficiently. To verify this:

- Issue the find command as follows:

  F WORD SUB FIRST

- You will see the following line:

  01 SUB PICTURE S9(5).

  The subscript index, SUB, is a non-computational or display variable. This means that each time this variable is manipulated or used, COBOL must convert the number from display format to a format that can be changed or compared mathematically.

- To improve the performance of your program, change the non-computational variable to a computational variable, as shown in the following example:

  01 SUB PICTURE S9(5) **COMPUTATIONAL.**

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- To see how performance is improved, you need to recompile the program.

6. Repeat the procedure described in “Verifying the Installation and Operation of InTune” on page 2-56 to recompile, run, and monitor the demonstration program.

7. Repeat the CodeView analysis as described above. Notice that the TUNCOB01 Csect has dropped below the IGZCIN1 Csect as a cause of delays. The numerical percentage has increased from 29.34 to 32.13, but the relative percentage between TUNCOB01 and IGZCIN1 has changed dramatically.

Figure 8-18 CodeView Panel after Program Modification

```
InTune --------------------------- CodeView ------------------ ROW 1 to 8 of 8
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: MOde Pseudo/Module/Csect/4GL,              Profile: TUNIVP1
                  PSEudo, REGister, ADDHelp                  Options: Normal
                                                                Mode: CSECT
Line commands: A - Associate     C - Callerid     D - Delays
               I - Info          L - Listing      S - Distribution
               H - Histogram    NH - Normalized Histogram
                                                                    Over
LC Module   Csect    Csect Description         L C Actv% Visual     Lap%
   ________ ________ ________________________ _ _ _____ __________ ____
>-------------------------------------------------------------------------------
__ TUNCOB01 IGZCIN1  INSPECT library subroutin < Y 42.90 ====>      0.06
__ TUNCOB01 TUNCOB01 Cobol test program distri <   32.13 ===>       0.19
__ IGG0193B IGG019TV QSAM EOB I/O DASD         <    1.75            0.64
__ IGG019AR IGG019AR QSAM SYNCH PUT            <    1.59            0.06
__ .USER    .USER    In user space               Y  1.11            0.00
__ .NUCLEUS IEC0SCR1                           <    0.08            0.00
__ IGG05530 IGG0553E                           <    0.08            0.00
__ IGG019AI IGG019AI QSAM PUT locate           <    0.08            0.00
```

Now that we have investigated the TUNCOB01 Csect, we will look at the IGZCIN1 Csect.

Using Callerid to Pinpoint Delays

You can use Callerid to determine which programs called various subroutines that are causing delays. From here, you can analyze the IGZCINI Csect.

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Figure 8-18 shows that 42.90 percent of the samples taken show CPU active for Csect IGZCIN1, a COBOL RUNTIME routine that is invoked when a specific function is called. IGZCIN1 performs the COBOL INSPECT function.

To determine where the INSPECT verb is issued in TUNCOB01:

1. Type C in the LC field of the TUNCOB01 IGZCIN1 line.

2. Press **Enter**.

The Callerid panel (Figure 8-19) is displayed:

Figure 8-19 Callerid Panel

```
InTune --------------------------- Callerid ------------------ ROW 1 to 2 of 2
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: REGister, ADDHelp                          Profile: TUNIVP1
                                                              Module: TUNCOB01
   Line commands: L - Listing                                  Csect: IGZCIN1

LC Module   Csect    Offset   Stmt  Csect Description         Pct   Visual
   ________ ________ ________ _____ ____________________________ _____ __________
>-------------------------------------------------------------------------------
__ TUNCOB01 TUNCOB01 000008B4   161 Cobol test program distri 45.22 ===>
__ TUNCOB01 TUNCOB01 0000087A   152 Cobol test program distri  6.61
```

Callerid shows that the INSPECT verb is issued in the program TUNCOB01 at statements 161 and 152. To verify this information:

3. Type L on either line.

4. Press **Enter**.

The program listing (Figure 8-20) is displayed:

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Figure 8-20 TUNCOB01 Program Listing

```
BROWSE - BB.XTSTI.COBLIST(TUNCOB01) ---------------- LINE 00000201 COL 001 080
COMMAND ===>                                                 SCROLL ===> PAGE
 000146         010800*-------------------------------------------------------
 000147         010900*  INSPECT
 000148         011000*-------------------------------------------------------
 000149         011100
 000150         011110  INSPECT-100.
 000151         011200     MOVE    "THIS IS SOME DATA" TO DATA-CONST1.
 000152         011300     INSPECT DATA-CONST1 TALLYING COUNT-03 FOR CHARACTERS
 000153         011400      AFTER INITIAL "T" REPLACING ALL "S" BY "O".
 000154         011500
 000155         011600*-----------------------------------------------------
 000156         011700*   INSPECT AGAIN
 000157         011800*-----------------------------------------------------
 000158         011900
 000159         011910  INSPECT1-100.
 000160         012000     MOVE    "EVEN MORE DATA FOR THE INSPECT TO DO" TO DATA-C
 000161         012100     INSPECT DATA-CONST2 TALLYING COUNT-03 FOR CHARACTERS
 000162         012200      AFTER INITIAL "E" REPLACING ALL "O" BY "Z".
 000163         014910
 000164         015100  STOP-100.
 000165         015200     CLOSE BIGBLOCK.
 000166         015300     CLOSE UNBLOCK.
 000167         015400     STOP RUN.
```

Finishing the Analysis

Return to the Interactive Analysis menu and select Option 0.

The Monitor OverView report (Figure 8-21) is displayed:

Figure 8-21 Monitor Overview after Program Modification

```
InTune ---------------------- Monitor OverView ------------ ROW 1 to 28 of 57
COMMAND ===>                                                 SCROLL ===> CSR
                                                             Profile: TUNIVP1

Sampler Statistics
--------------------------------------------------------------------------------
Monitor Data Set:  TUN21.ABCDEF.TUNIVP1.D990107.T120720
Final Rate:        10Msec   Start Date: 1999/01/07     CICS Lvl: **N/A**
Samples:             1522   Start Time: 12:07:37       DB2 Lvl:  **N/A**
Sample Balance:      0.89   Elapsed:    00:00:18       IMS Lvl:  **N/A**

Job Statistics                                         System Statistics
-----------------------------------------------        ------------------------
Jobname:   TUNIVP1          TCB Time:    12.47         MVS Lvl:   SP6.0.3
Stepname:  IVP              SRB Time:     0.91         CPU Type:  9672
Procstep:                   Active%:     76.60         CPU Model: 15
Program:   TUNCOB01         Wait%:        1.11         Serial:    01317
```

Notice that the elapsed time has been reduced from 36 seconds to 18 seconds. Because the monitor session lasts for the entire duration of the job, this shows you that by making a few modifications, the program takes half the time to run than it did previously.

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Using InTune's Additional Features

In addition to the basic InTune tasks of defining, invoking, and analyzing monitors, there are several features available which can assist you with tuning your applications. This section provides information about these features, which are accessed from InTune's Primary Option Menu. The following tasks are described:

Creating and Using Global Monitors 9-2
Analyzing Monitor Data Sets Created by Other Users 9-4
Performing Administrative Functions 9-11
Using the Administration Option Menu 9-11
Defining Pseudo Groups 9-16
Updating Content-Sensitive Help 9-20
Registering Source Program Listings 9-34

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Creating and Using Global Monitors

Global Monitor Definitions are associated with the InTune Server and not a specific user. Use the Global Monitoring Menu to manage monitor information located in the Global Information File (GIF). This includes monitors invoked using the InTune Open API.

Using the Global Monitoring Menu

The Global Monitor Definitions menu is used to set up a new monitor definition, modify or delete existing definitions, invoke a monitor, and check the status of data collection for monitor definitions. Once data collection is complete, use the External option to analyze the results.

Select Option G to display the Global Monitoring Menu (Figure 9-1).

Figure 9-1 Global Monitoring Menu

```
InTune ---------------------- Global Monitoring Menu --------------------------
 OPTION  ===>

    0  Parameters      - Enter global monitor parameters       Userid: BAOMXY2
                                                           Server ID: INTUNE
    1  Monitor         - Create and analyze Monitor Sets       Status: ACTIVE
                                                            Release: 2.2.0
    2  Active          - Select an active job to monitor
    3  Registration    - Shared listing registration
    4  Grouping        - Define groups of monitors


 Enter an option or press END to return to the InTune Primary Option Menu
```

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Table 9-1 describes the options available on the Global Monitoring Menu panel.

Table 9-1 InTune Global Monitoring Menu Pane

Option	Description
Option 0 (Parameters)	Displays the Profile Parameters panel where you can modify InTune's default display settings. These global parameters are identical to the user profile parameters. See "Setting Up InTune Profile Parameters" on page 2-48 for complete information.
Option 1 (Monitor)	Displays the Monitor Definition panel where you can set up a new monitor definition, modify or delete and existing definition and view the status of data collection.
Option 2 (Active)	Displays the Active Jobs panel, which allows you to create and invoke a monitor session for any active job. Refer to Chapter 6, "Invoking a Monitor" for more information.
Option 3 (Registration)	Displays the Program Listing Registration panel where you can specify program listings for Assembler and high-level languages with InTune. This allows InTune to correlate program activity to the high-level language statements instead of to only offsets with modules and/or Csects.
Option 4 (Grouping)	Displays the Monitor Profile Groups panel that allows you to define groups of jobsteps that can be monitored together while also specifying the jobstep that initiates (or "triggers") the monitoring of the group. Refer to "Creating a Multi-Job Monitor: Grouping" on page 5-25 for more information.

Changing the Global Monitor Definition Default Criteria

When you invoke a monitor using TUNCALL, default monitoring criteria are used unless otherwise specified. The default values are contained in the Global Profile Parameters table. To change the default values:

1. Select Option 0 from the Global Monitoring Menu.

2. Press **Enter**.

   The Profile Parameters panel (Figure 2-15 on page 2-49) is displayed.

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3. Change the criteria as required. Refer to “Setting Up InTune Profile Parameters” on page 2-48 for more information.

4. Press **End** to exit the panel and save the defaults.

Analyzing Global Monitor Data Sets

Global monitor data sets are analyzed the same way as normal monitors. You can display the Interactive Analysis menu using the A, AL, AA, or AW line commands for the data set name. These line commands work the same way as they do for the Monitor Definition panel, as described in “Starting Interactive Analysis” on page 7-2.

Analyzing Monitor Data Sets Created by Other Users

InTune allows you to analyze monitor data sets created by other users. Select Option 5 from the Primary Option Menu.

The External Data Set List panel is displayed:

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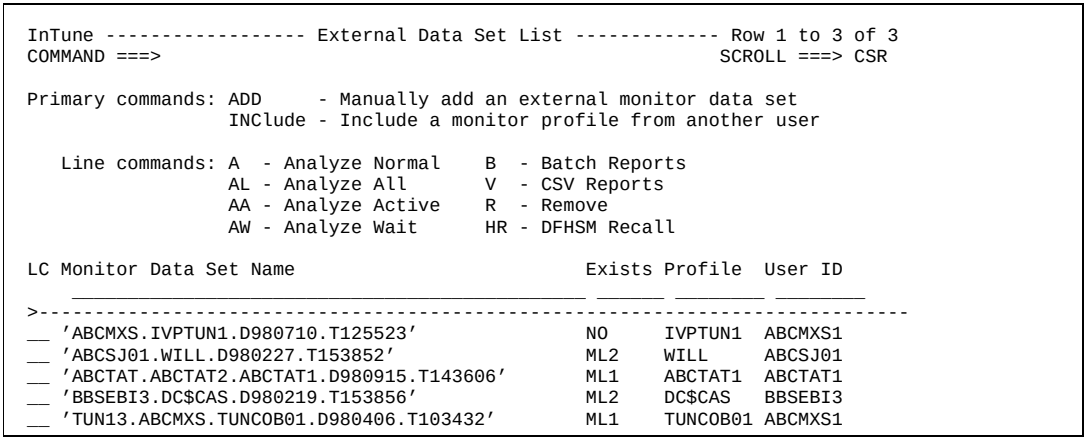
Figure 9-2 External Data Set List Panel



```
InTune ------------------ External Data Set List ------------- Row 1 to 3 of 3
COMMAND ===>                                                  SCROLL ===> CSR

Primary commands: ADD     - Manually add an external monitor data set
                  INClude - Include a monitor profile from another user

   Line commands: A  - Analyze Normal    B  - Batch Reports
                  AL - Analyze All       V  - CSV Reports
                  AA - Analyze Active    R  - Remove
                  AW - Analyze Wait      HR - DFHSM Recall

LC Monitor Data Set Name                          Exists Profile  User ID
   ____________________________________________ _______ ________ ________
>-------------------------------------------------------------------------------
__ 'ABCMXS.IVPTUN1.D980710.T125523'               NO     IVPTUN1  ABCMXS1
__ 'ABCSJ01.WILL.D980227.T153852'                 ML2    WILL     ABCSJ01
__ 'ABCTAT.ABCTAT2.ABCTAT1.D980915.T143606'       ML1    ABCTAT1  ABCTAT1
__ 'BBSEBI3.DC$CAS.D980219.T153856'               ML2    DC$CAS   BBSEBI3
__ 'TUN13.ABCMXS.TUNCOB01.D980406.T103432'        ML1    TUNCOB01 ABCMXS1
```

Table 9-2 describes the fields in the External Data Set List panel.

Table 9-2 External Data Set List Panel Fields

Field	Description
Monitor Data Set Name	Data set name of the monitor data set.
Exists	Indicator of data set availability. The following values may be displayed in this field: • **YES** - The data set containing the sample data for the monitor instance is available and has not been migrated. • **NO** - The data set is not found. • **ML1** - The data set containing the sample data for the monitor instance exists but is migrated to the DFSMShsm ML1 migration pool. ML1 migration generally goes to disk. • **ML2** - The data set containing the sample data for the monitor instance exists but is migrated to the DFSMShsm ML2 migration pool. ML2 migration generally goes to tape. • **INV** - The data set name is invalid. If this value is displayed, check the entry to make sure the data set name is valid before continuing. • **PER** - A program error occurred. This may indicate a catalog error other than the data set not being found. See your technical support staff for more information.
Profile	A unique identifier which designates a particular monitor definition. This can be one to eight alphanumeric characters.

Table 9-2 External Data Set List Panel Fields

Field	Description
User ID	The identifier of the user who last invoked the monitor definition. The identifier may be one of the following: • A TSO userid, if the request was submitted from the Monitor Definition panel or the Display Active panel. • A batch job name, if the request was submitted from TUNCALL in a batch job.
User Prefix	The TSO data set prefix. This is a one-to-seven character alphanumeric value saved as part of the user's TSO profile.
Date	The date on which the monitor was started.
Time	The time when the monitor was started.
Description	User-specified description of the monitor definition.

Including a Monitor Data Set from an External User

When you first display the External Data Set List panel, it does not contain any monitor data set names. You must add the names of the data sets you want. monitor data sets are listed in the User Information File for each user. You can access another user’s User Information File by using the INCLude primary command:

1. In the COMMAND field, type INCL.

2. Press **Enter**.

   The Add Monitor Data Set panel (Figure 9-3) is displayed:

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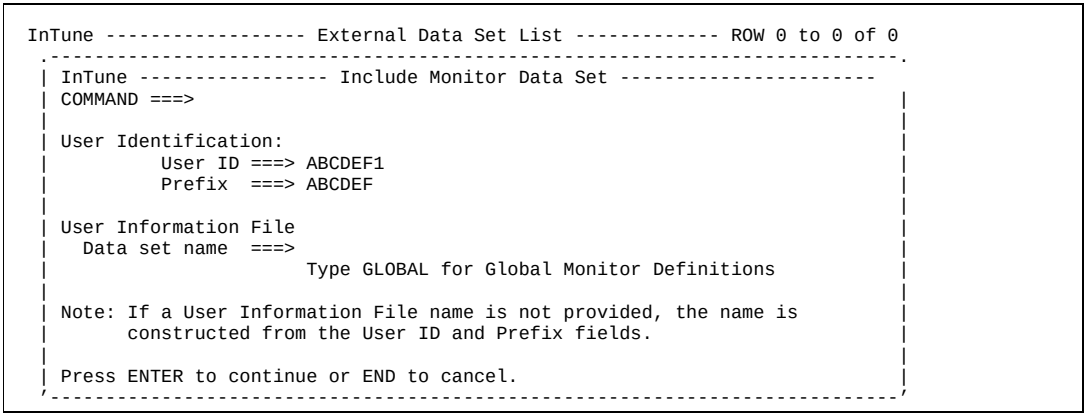
Figure 9-3 Include Monitor Data Set Panel



3. Specify the data set name where the monitor data sets you are interested in are located.

   By default, a user's tables data set name is *prefix*.*userid*.TUN22.TABLES. If your installation uses the default tables data set names, you can access a user's data set by specifying his or her TSO user ID and prefix in the User Identification fields. If your installation does not use the default tables data set names, you must specify the correct value in the Dataset name field.

To add Global monitor data sets, specify GLOBAL. See Chapter 10, “InTune Open Application Program Interface” for more information.

4. Press **Enter** to display the Monitor Profiles panel (Figure 9-4). This panel displays the profiles available within the specified User Information File.

Figure 9-4 Monitor Profiles Panel

```
InTune ---------------------- Monitor Profiles -------------- ROW 1 to 3 of 3
COMMAND ===>                                                  SCROLL ===> CSR

                                                            User ID: ABCDEF1
Line commands: S - Select  H - History                       Prefix: ABCDEF

LC Profile  Description               Userid   Status     Date        Time
   ________ ____________________________ ________ __________ __________ ________
>-------------------------------------------------------------------------------
__ ABCDEF1                            ABCDEF1  Inactive   1998/11/20  07:41:36
S_ JOBN                               ABCDEF1  Inactive   1998/09/14  09:27:35
__ TUNCOB04                                    Inactive
```

5. To select the most recent monitor data set for a profile, type S next to the appropriate profile name and press **Enter**.

6. To display a list of all monitor data sets associated with a profile, type H next to the appropriate profile name and press **Enter**.

7. The Monitor History panel (Figure 9-5) is displayed:

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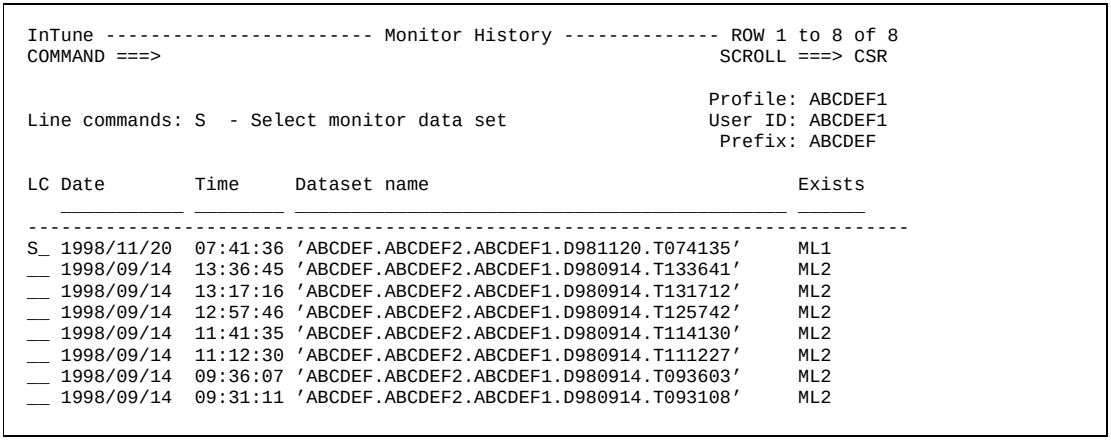
Figure 9-5 Monitor History Panel



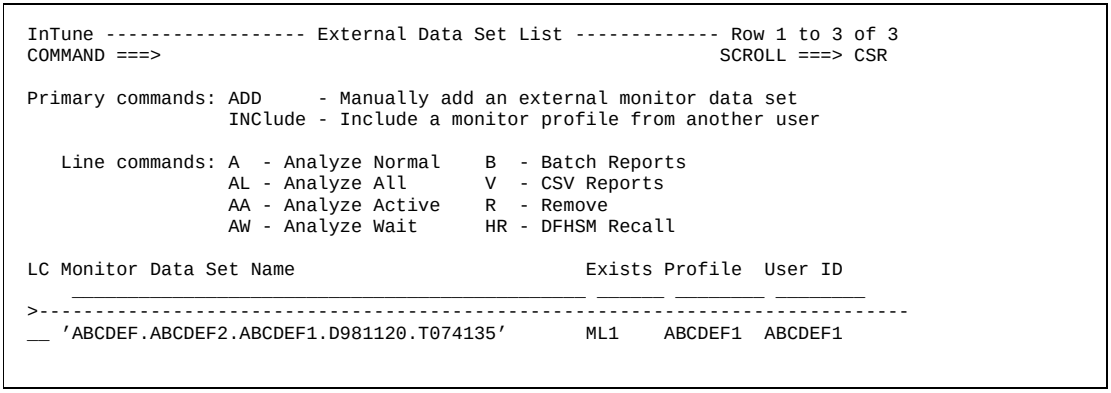
```
InTune ------------------------ Monitor History -------------- ROW 1 to 8 of 8
COMMAND ===>                                                    SCROLL ===> CSR

                                                               Profile: ABCDEF1
Line commands: S  - Select monitor data set                    User ID: ABCDEF1
                                                                Prefix: ABCDEF

LC Date        Time     Dataset name                                    Exists
   ___________ ________ ____________________________________________ _______
-------------------------------------------------------------------------------
S_ 1998/11/20  07:41:36 'ABCDEF.ABCDEF2.ABCDEF1.D981120.T074135'     ML1
__ 1998/09/14  13:36:45 'ABCDEF.ABCDEF2.ABCDEF1.D980914.T133641'     ML2
__ 1998/09/14  13:17:16 'ABCDEF.ABCDEF2.ABCDEF1.D980914.T131712'     ML2
__ 1998/09/14  12:57:46 'ABCDEF.ABCDEF2.ABCDEF1.D980914.T125742'     ML2
__ 1998/09/14  11:41:35 'ABCDEF.ABCDEF2.ABCDEF1.D980914.T114130'     ML2
__ 1998/09/14  11:12:30 'ABCDEF.ABCDEF2.ABCDEF1.D980914.T111227'     ML2
__ 1998/09/14  09:36:07 'ABCDEF.ABCDEF2.ABCDEF1.D980914.T093603'     ML2
__ 1998/09/14  09:31:11 'ABCDEF.ABCDEF2.ABCDEF1.D980914.T093108'     ML2
```

8. Type S next to the appropriate data sets and press **Enter**.

9. Press **End** to return to the External Data Set List panel.

The monitor data sets for the selected profile has been added to the External Data Set List (Figure 9-6 on page 9-9).

Figure 9-6 External Data Set List Panel After Adding Data Sets



```
InTune ------------------ External Data Set List ------------- Row 1 to 3 of 3
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: ADD     - Manually add an external monitor data set
                  INClude - Include a monitor profile from another user

   Line commands: A  - Analyze Normal    B  - Batch Reports
                  AL - Analyze All       V  - CSV Reports
                  AA - Analyze Active    R  - Remove
                  AW - Analyze Wait      HR - DFHSM Recall

LC Monitor Data Set Name                          Exists Profile  User ID
   ____________________________________________ _______ ________ ________
>-------------------------------------------------------------------------------
__ 'ABCDEF.ABCDEF2.ABCDEF1.D981120.T074135'       ML1    ABCDEF1  ABCDEF1
```

Adding a Monitor Data Set

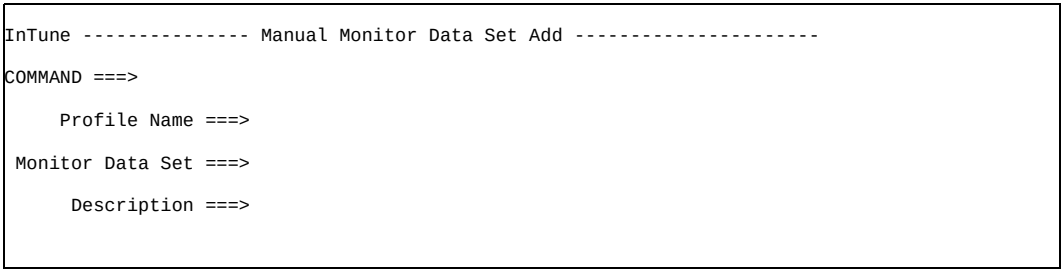
You can also manually enter a specific data set name of a monitor data set to analyze monitor data which is not associated with a particular User or Global Information File. To manually add a monitor data set:

1. In the COMMAND field, type ADD.

2. Press **Enter**.

   The Manual Monitor Data Set Add panel (Figure 9-7) is displayed.

Figure 9-7 Manual Monitor Data Set Add Panel



3. Enter the profile name and the monitor data set name. Optionally, enter a description for the profile.

4. Press **End** to return to the External Data Set List panel.

Analyzing External Data Sets

Now that the External Data Set List contains monitor data sets, you can display the Interactive Analysis menu using the A, AL, AA, or AW line commands for the data set name. These line commands work the same way as they do for the Monitor Definition panel, as described in “Starting Interactive Analysis” on page 7-2.

To recall in the background a data set that has been migrated, type HR next to the appropriate profile name and press **Enter**.

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Removing External Data Sets

To remove a data set from your list, type R next to it and press **Enter**. The original data set will not be deleted.

Performing Administrative Functions

The following sections describe:

- Using the Administration Option Menu
- Registering Source Program Listings
- Defining Pseudo Groups
- Updating Content-Sensitive Help
- Displaying InTune and Environmental Information

Using the Administration Option Menu

Use the Administration Option Menu panel if you are an InTune administrator to register program listings for Assembler and high-level languages with InTune. Registration allows InTune to relate program activity to the high-level language statements instead of to offsets within modules and Csects.

Figure 9-8 Administration Option Menu

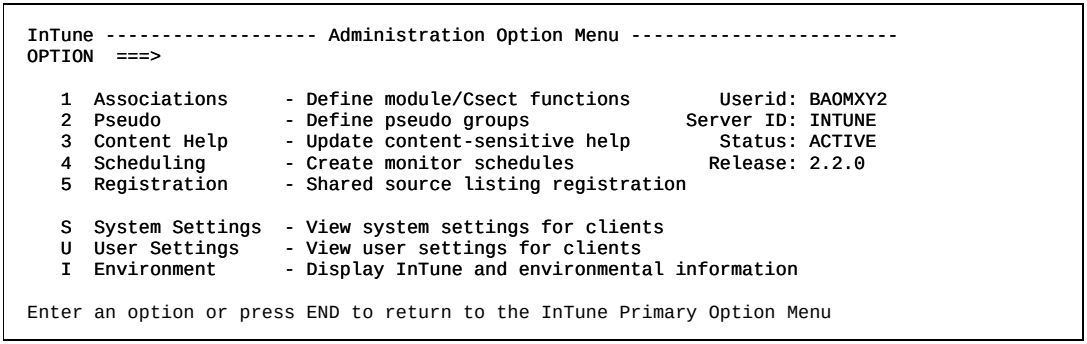

Table 9-3 describes the options available on the Administration Option Menu panel.

Table 9-3 InTune Administration Option Menu Panel

Option	Description
Option 1 (Associations)	Displays the Csect Associations panel, which allows you to assign functional descriptions to Csects. These functional descriptions appear on InTune analysis panels, such as CodeView, DelayView, and ModView. Refer to “Adding a Csect Description” on page 8-15 for more information.
Option 2 (Pseudo)	Displays the Pseudo Group Definitions panel, which allows you to group related program modules into Pseudo Groups. This enables InTune to provide simplified reporting on these modules. Refer to “Defining Pseudo Groups” on page 9-16 for more information.
Option 3 (Content Help)	Displays the Content-sensitive Help panel, which allows you to add content-sensitive online help. This enables you to provide specific information about delay causes, Pseudo Groups, and Csects. For more information about content-sensitive help, see “Updating Content-Sensitive Help” on page 9-20.
Option 4 (Scheduling)	Displays the Schedule Definitions panel where you can create shifts/schedules for monitoring activity. For information, refer to “Creating a Monitor Schedule” on page 5-28.
Option 5 (Registration)	Displays the Program Listing Registration panel, which allows you to register program listings to relate program activity to actual high-level language statements. Refer to “Registering Source Program Listings” on page 9-34 for more information.

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Table 9-3 InTune Administration Option Menu Panel

Option	Description
Option S (System Settings)	Displays the default parameter values set for an InTune system. These values are set with the TUNSDEFS batch procedure (they cannot be changed from this panel). Refer to “System Default Settings” on page 3-4.
Option U (User Settings)	Displays the default parameter values set for new InTune users. These values are set with the TUNUDEFS batch procedure (they cannot be changed from this panel). Refer to “User Default Settings” on page 3-7.
Option I (Environment)	Displays InTune and environmental information that should be examined with the assistance of BMC Software Customer Support personnel. It contains information such as the maintenance level, storage blocks, and the OS/390 environments in which the server and client are running. Refer to “Displaying InTune and Environmental Information” on page 9-31.

Csect Associations

Associating functional descriptions to Csects aids you during analysis in identifying what each Csect does. These Csect descriptions appear on the CodeView, ModView, and Callerid analysis panels.

InTune comes with thousands of IBM system routines, COBOL library routines, DB2 routines, and CICS routines already defined.

Note

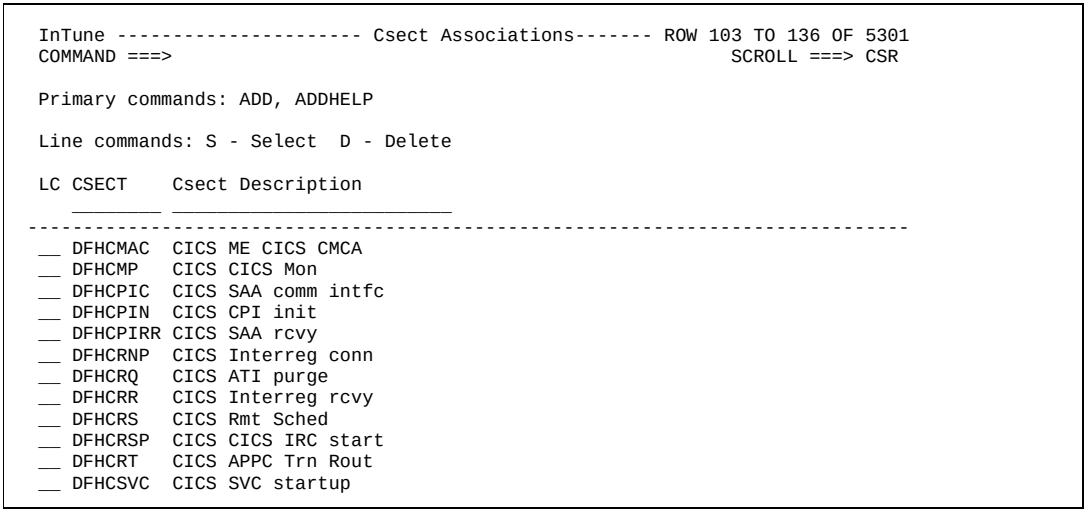
The Csect Associations application is also available using the **A**ssociate line command when you are either displaying the TimeView panel, or the CodeView panel with Csect=ON.

Adding Csect Descriptions

1. Select Option 1 from the Administration Option Menu.

   The Csect Associations panel (Figure 9-9) is displayed:

Figure 9-9 Csect Associations Panel



The Csect Associations panel allows you to enter new descriptions of Csects or to modify existing Csect descriptions. The CSECT field lists the names of Csects for which a reference has been established. The Csect description field lists the description for the Csect. Many of the common Csects found while monitoring programs in COBOL, CICS, or DB2 environments are listed on the Csect Associations panel already.

2. To add a new Csect description, type ADD in the COMMAND field and press **Enter**.

   The Csect Associations pop-up window (Figure 9-10) is displayed.

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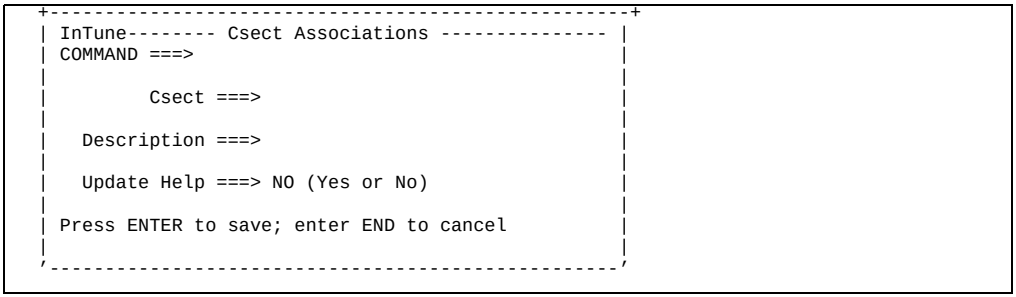
Figure 9-10 Csect Associations Pop-Up Window



3. To modify an existing Csect description, use the Select line command. The Csect Associations pop-up window is displayed with the current description of the Csect.

4. Type both the name of the Csect and a description for the new Csect, or edit the existing Csect description.

   You may type up to 57 characters for the description. InTune displays the Csect description on initial panel display on the Delay Locations, Callerid, CodeView, and ModView panels. Due to screen width limitations, the Csect Description field displays a truncated version of the description on some terminal types. In this case, to view the full text of the description, scroll right until you see the Extended Csect Description field. The Extended Csect Description field displays the entire 57 character description.

5. To add content-sensitive help for the Csect, specify YES in the Update Help field. See “Updating Content-Sensitive Help” on page 9-20 for more information.

6. Press **Enter** when finished. The new or updated Csect description will appear on the Csect Associations panel.

Defining Pseudo Groups

InTune uses the concept of pseudo groups to treat related modules as a single group in the CodeView application. Elapsed time in all modules within a pseudo group is reported using the pseudo group name.

A pseudo group contains modules with names that start with the prefix or prefixes assigned to the pseudo group. You can include any number of prefixes in a single pseudo group, but the same prefix should not be a part of multiple pseudo groups.

Associating modules with Pseudo Groups

1. Select Option 2 from the Administration Option Menu.

   The Pseudo Group Definitions panel (Figure 9-11) is displayed.

Note

You can also access the Pseudo Group Definitions panel directly from CodeView by using the PSEudo primary command. Refer to “Interactive Analysis Option 3 - CodeView” on page 7-31

Figure 9-11 Pseudo Group Definitions Panel

```
InTune ---------------- Pseudo Group Definitions ----------- ROW 1 to 14 of 29
COMMAND ===>                                                  SCROLL ===> CSR

Primary commands: ADD, ADDHELP

   Line commands: S - Select  D - Delete

LC Module   Pseudo
   ________ ________
------------------------------------------------------------------------------
__ ADF      .TSO
__ BUD      .BUDGET
__ CEE      .LE/390
__ CMR      .CMGR
__ DBF      .IMS
__ DFH      .CICS
__ DFS      .IMS
__ DLZ      .IMS
__ DSN      .DB2
__ DSQ      .QMF
```

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The Module column contains the module prefix for a module or group of modules beginning with this prefix that are to be included in the pseudo group.

The Pseudo column contains the name of the pseudo group to which you have assigned the module.

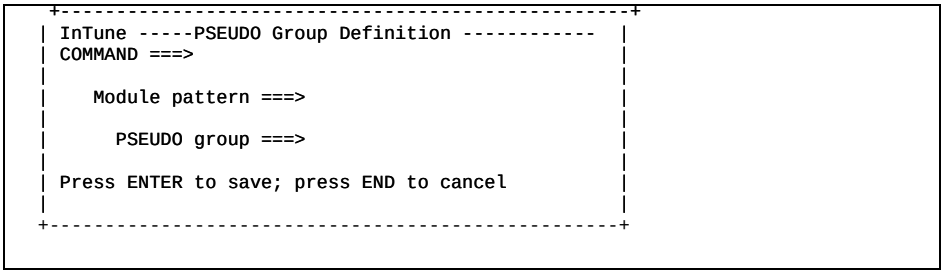
2. To add a new module to a pseudo group, type the ADD primary command.

3. To change an existing entry, type S next to the module you want to modify.

4. Press **Enter**.

   The PSEUDO Group Definition window (Figure 9-12) is displayed.

Figure 9-12 PSEUDO Group Definition Window



5. In the Module pattern field, type one to eight characters of the module name to be associated with an existing or new pseudo group. For IBM modules, this is usually three characters; for example, TSO modules begin with IKJ.

6. In the PSEUDO group field, type the name of the pseudo group that the module is to be associated with. The name entered in this field can be either a new pseudo group name or the name of an existing pseudo group.

Note

The name for the pseudo group must not be longer than seven characters. A pseudo group name is always prefixed by a period (.). Do not type the period in this field; it is added automatically.

Adding Help Information for Pseudo Groups

You can add content-specific help for a pseudo group by using the ADDHelp primary command. See “Updating Content-Sensitive Help” on page 9-20 for more information. When using the CodeView application with MODULE: OFF, the module’s activity is displayed with its specified pseudo group.

Displaying Pseudo Groups

Pseudo groups are displayed in the CodeView interactive analysis panel, based on the display mode selected.

PSEUDO mode:

Activity is displayed by Pseudo Group (Figure 9-13 on page 9-19). Use the MOde PSEudo primary command.

MODULE mode:

Activity is displayed by module, with Pseudo Group information included (Figure 9-14 on page 9-19).

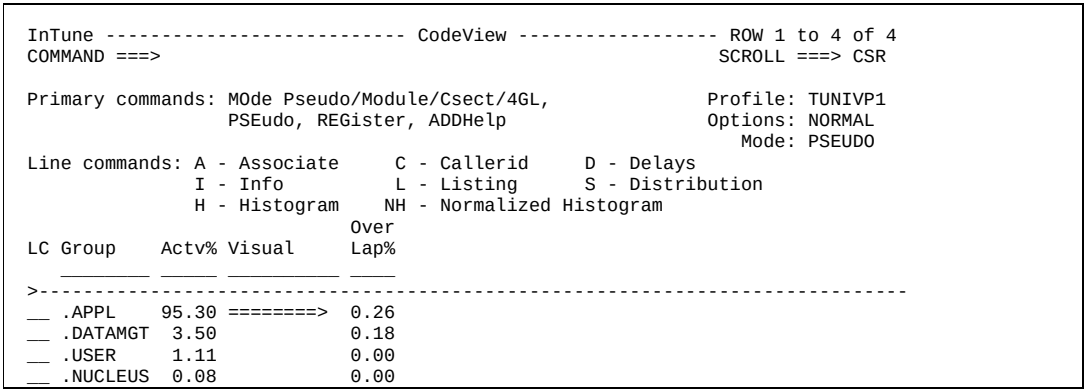
CSECT mode:

Pseudo Group information is not displayed.

4GL mode:

Pseudo Group information is not displayed.

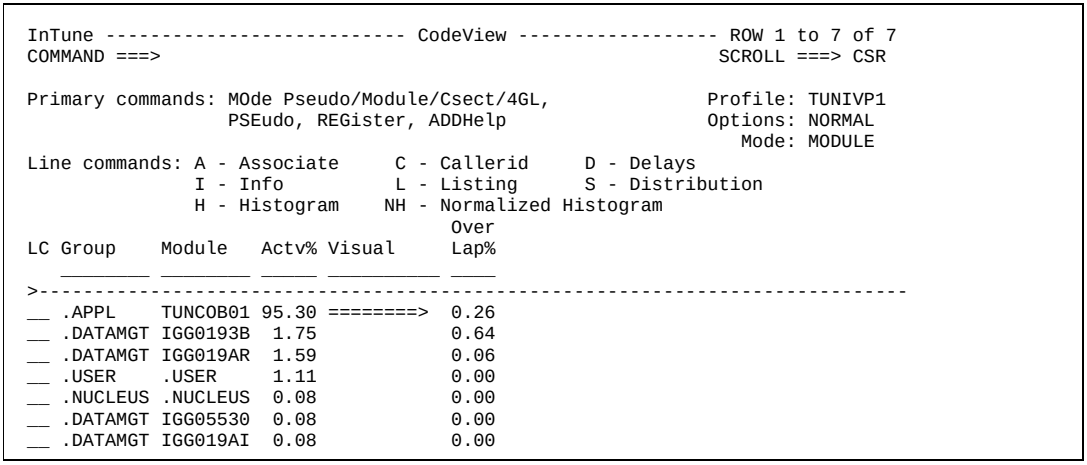
Figure 9-13 CodeView Panel in PSEUDO Mode



```
InTune --------------------------- CodeView ------------------ ROW 1 to 4 of 4
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: MOde Pseudo/Module/Csect/4GL,              Profile: TUNIVP1
                  PSEudo, REGister, ADDHelp                  Options: NORMAL
                                                                Mode: PSEUDO
Line commands: A - Associate     C - Callerid     D - Delays
               I - Info          L - Listing      S - Distribution
               H - Histogram    NH - Normalized Histogram
                              Over
LC Group    Actv% Visual     Lap%
   ________ _____ __________ ____
>-------------------------------------------------------------------------------
__ .APPL    95.30 ========>  0.26
__ .DATAMGT  3.50            0.18
__ .USER     1.11            0.00
__ .NUCLEUS  0.08            0.00
```

Figure 9-14 CodeView Panel in MODULE Mode



```
InTune --------------------------- CodeView ------------------ ROW 1 to 7 of 7
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: MOde Pseudo/Module/Csect/4GL,              Profile: TUNIVP1
                  PSEudo, REGister, ADDHelp                  Options: NORMAL
                                                                Mode: MODULE
Line commands: A - Associate     C - Callerid     D - Delays
               I - Info          L - Listing      S - Distribution
               H - Histogram    NH - Normalized Histogram
                                   Over
LC Group    Module   Actv% Visual     Lap%
   ________ ________ _____ __________ ____
>-------------------------------------------------------------------------------
__ .APPL    TUNCOB01 95.30 ========>  0.26
__ .DATAMGT IGG0193B  1.75            0.64
__ .DATAMGT IGG019AR  1.59            0.06
__ .USER    .USER     1.11            0.00
__ .NUCLEUS .NUCLEUS  0.08            0.00
__ .DATAMGT IGG05530  0.08            0.00
__ .DATAMGT IGG019AI  0.08            0.00
```

Updating Content-Sensitive Help

InTune features content-sensitive online help information for Csects, pseudo groups, and delay categories. To display this information, place the cursor on a highlighted field and press **PF1**. You can add to the help topics provided by InTune by writing your own help for any topic to customize the information to your site.

There are two components for Content-sensitive help information:

Entry	Identifies the help information by Content, Content Type, Help Member, Help Topic, and Info Level. This information is displayed in the Content Sensitive Help panel.
Text	The actual help information displayed when content-sensitive help is requested. Help text is located in a help member. Each help member may contain several help topics. Help members are located in the *hilevel*.SBBHELP data set for your site.

7. Select Option 3 from the Administration Option Menu.

   The Content Sensitive Help panel (Figure 9-15) is displayed:

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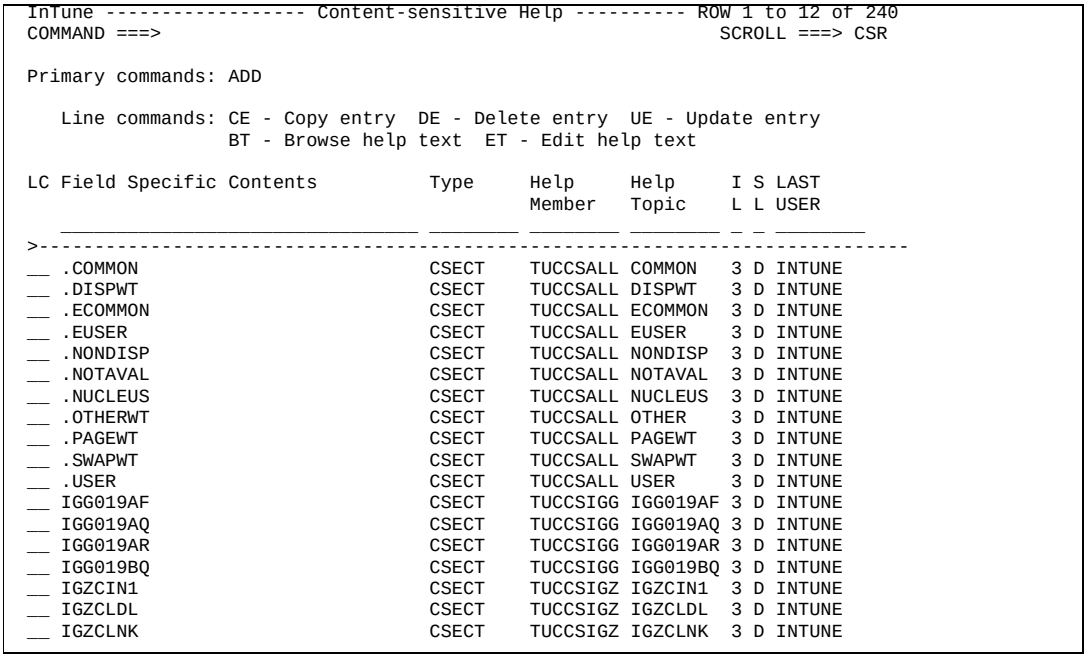
Figure 9-15 Content Sensitive Help Panel



```
InTune ------------------ Content-sensitive Help ---------- ROW 1 to 12 of 240
COMMAND ===>                                                 SCROLL ===> CSR

Primary commands: ADD

   Line commands: CE - Copy entry  DE - Delete entry  UE - Update entry
                  BT - Browse help text  ET - Edit help text

LC Field Specific Contents          Type     Help     Help     I S LAST
                                             Member   Topic    L L USER
   ___________________________________ ________ ________ ________ _ _ ________
>-------------------------------------------------------------------------------
__ .COMMON                          CSECT    TUCCSALL COMMON   3 D INTUNE
__ .DISPWT                          CSECT    TUCCSALL DISPWT   3 D INTUNE
__ .ECOMMON                         CSECT    TUCCSALL ECOMMON  3 D INTUNE
__ .EUSER                           CSECT    TUCCSALL EUSER    3 D INTUNE
__ .NONDISP                         CSECT    TUCCSALL NONDISP  3 D INTUNE
__ .NOTAVAL                         CSECT    TUCCSALL NOTAVAL  3 D INTUNE
__ .NUCLEUS                         CSECT    TUCCSALL NUCLEUS  3 D INTUNE
__ .OTHERWT                         CSECT    TUCCSALL OTHER    3 D INTUNE
__ .PAGEWT                          CSECT    TUCCSALL PAGEWT   3 D INTUNE
__ .SWAPWT                          CSECT    TUCCSALL SWAPWT   3 D INTUNE
__ .USER                            CSECT    TUCCSALL USER     3 D INTUNE
__ IGG019AF                         CSECT    TUCCSIGG IGG019AF 3 D INTUNE
__ IGG019AQ                         CSECT    TUCCSIGG IGG019AQ 3 D INTUNE
__ IGG019AR                         CSECT    TUCCSIGG IGG019AR 3 D INTUNE
__ IGG019BQ                         CSECT    TUCCSIGG IGG019BQ 3 D INTUNE
__ IGZCIN1                          CSECT    TUCCSIGZ IGZCIN1  3 D INTUNE
__ IGZCLDL                          CSECT    TUCCSIGZ IGZCLDL  3 D INTUNE
__ IGZCLNK                          CSECT    TUCCSIGZ IGZCLNK  3 D INTUNE
```

Table 9-4 describes the available line commands.

Table 9-4 Content Sensitive Help Line Commands

Command	Description
CE	**Copy Entry**. Use this line command to display the Content Help Copy window, which allows you to copy the selected table entry and help text.
DE	**Delete Entry**. Use this line command to remove a user-created help topic. This line command is not valid if the SL field contains the value D.
UE	**Update Entry**. Displays the Content Help Update window. Use this window to change information for an existing entry. You can change the info level, the help member, or the help topic, and edit the help text. This line command is not valid if the SL field contains the value D.
BT	**Browse Text**. Displays a pop-up window with the help text for the topic. Use this window to verify that the help text is formatted correctly.
ET	**Edit Text**. Displays the help member in edit mode. See “Writing Content-Sensitive Help Text” on page 9-26 for information about typing help text. This line command is not valid if the SL field contains the value D.

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Table 9-5 describes each field in the Content Sensitive Help panel.

Table 9-5 Content Sensitive Help Fields

Field	Description
Field Specific Contents	Contents of the field for which the help topic was written.
Type	The category for the help information. Valid types are: • CSECT (load module CSECTs) • DB2PLAN (DB2 plan names) • DB2TYPE (DB2 calls) • MAJDELAY (major delay descriptions) • MINDELAY (minor delay descriptions) • MODULE (load module names) • TRANCODE (CICS/IMS transaction names)
Help Member	Member name of the *hilevel*.SBBHELP data set in which the text for the topic is found.
Help Topic	One- to eight-character identifier for the help information. The Help Topic is a subtopic of the Help Member.
I L	Info level of the help information. This indicates the importance or severity of the information, and defines the highlight color of the field content. Info level 1 (red) indicates a known cause of problems. Info level 2 (yellow) indicates a potential cause of problems. Info level 3 (white) indicates informational content.
S L	Source level of the available help. U indicates user-written help information provided by your site. D indicates distributed help information provided by BMC Software.
Last User	User ID of the last person to update the help topic. For distributed help information, the User ID is INTUNE.
Date	Date that the help was last updated.
Time	Time that the help was last updated.

In the example below (Figure 9-16), the help text is shown for the Attach SVC minor delay category. The text is located in *hilevel*.SBBHELP member TUCMALOD under the topic ATTACHSV. The type of help is MINDELAY.

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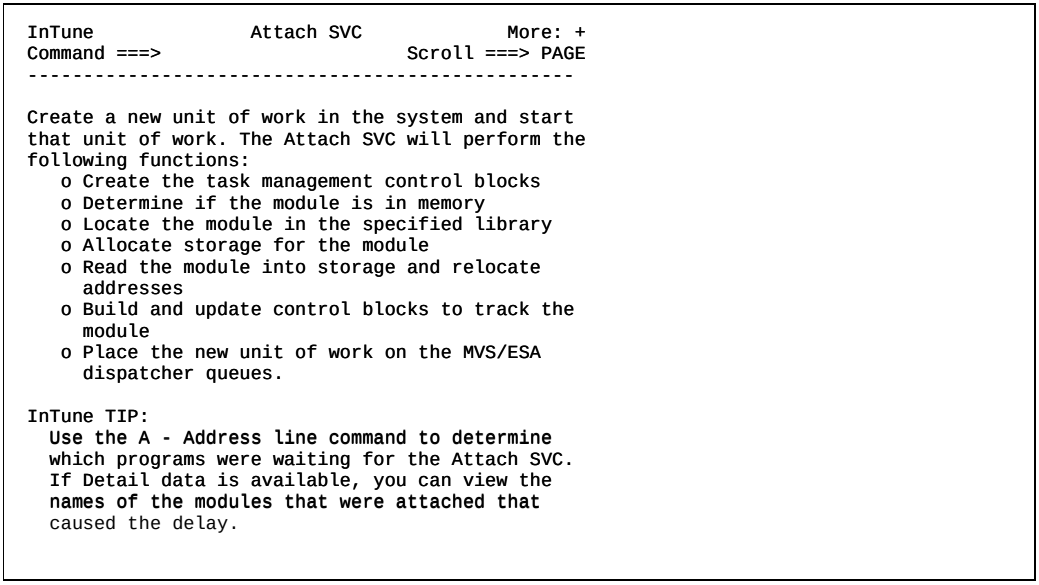
Figure 9-16 Content-Sensitive Help Text



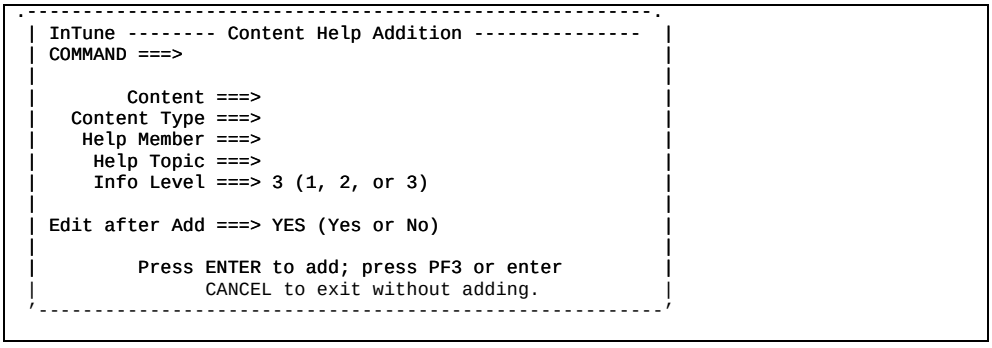
Adding Content-Sensitive Help

You can add help information for a specific content either from the Content-sensitive Help panel (Figure 9-15 on page 9-21) or directly from the DelayView, CodeView, Histogram, or DataView interactive analysis panels (see Chapter 7, “Analyzing Monitor Data”).

1. Type ADD in the COMMAND field.

   The Content Help Addition window is displayed (see Figure 9-17).

Figure 9-17 Content Help Addition Window



2. Specify the following values:

   - Content - The specific content for which the help topic is to be written; for example, if you are writing help for the IGZXCDI Csect, type IGZXCDI in this field.

   - Content - The type of content; for example, if you are providing help for Data Delay (a major category), type MAJDELAY in this field.

   - Help Member - The eight-character name of the *hilevel*.SBBHELP member into which this help topic will be written. You may have several help topics in one help member.

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- Help Topic - The eight-character name of the subtopic in the help member. Typically, this is the same or similar to the name of the content.

- Info Level - Specify 1 (red), 2 (yellow), or 3 (white).

- Edit after Add - Specify YES to display an edit session for the help topic; specify NO to create the new help topic without adding help text at this time.

3. When finished, press **Enter**.

4. If you specified YES in the Edit after Add field, type the information you want displayed when a user is seeking information about the specific content. You can use text only, or you can use a set of control characters to format the text. See "Writing Content-Sensitive Help Text" on page 9-26 for more information.

5. When you have finished writing the help text, press **End** to return to the Content Sensitive Help panel.

Copying a Content-Sensitive Help Entry

If you want to change a distributed Help entry and text, you must first make a copy of the information. You cannot edit distributed help topics directly.

1. Type CE next to the help topic you wish to copy and press **Enter**. The Content Help Addition window is displayed with the current information for the topic.

2. Change Help Member to a new name. The new name must be a valid PDS or PDSE name, and cannot begin with "TUC".

3. Specify YES in the Edit after Add field if you wish to edit the help topic text. Refer to "Editing Content-Sensitive Help Text" on page 9-26.

4. When you have finished, press **End** to return to the Content Sensitive Help panel.

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The edited help topic will appear on the Content-Sensitive Help panel with the Source Level field set to U. The original entry will remain unchanged. When you display content-sensitive help information, the user-level text is displayed.

Updating a Content-Sensitive Help Entry

1. Type UE next to the help topic you wish to update and press Enter. The Content Help Addition window is displayed with the current information for the topic.

2. Change the information as required. Specify YES in the Edit after Add field if you wish to edit the help text.

3. When you have finished, press **End** to return to the Content Sensitive Help panel.

Editing Content-Sensitive Help Text

1. Type ET next to the existing topic on the Content Sensitive Help panel and press **Enter**. The member is displayed in ISPF edit mode.

2. Using ISPF edit, edit the text as required. You can use text only, or you can use a set of control characters to format the text.

3. When you have finished editing the help text, press **End** to return to the Content-sensitive Help panel.

Writing Content-Sensitive Help Text

Before you begin writing help, you need to understand the following features of the help processor:

- An :H1 tag is automatically added to the selected member of *hilevel*.SBBHELP. This tag has an associated ID= attribute. The ID= attribute contains the help topic member and the name of the content. You must not change this ID= attribute or InTune will not be able to locate the help text.

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- A :p. tag is automatically added to the line after the :H1 tag. This tag acts as a separator between the header and the help text.

- Type your help text below the :p. tag. See Table 9-6, “Tags Available for Writing Content-Specific Help,” on page 9-27 for information about using markup tags to format your text.

Note

InTune automatically adds one space between each continuous word or character string, regardless of the actual number of spaces or line breaks. If you need to display text exactly as typed, use the example tag, :xmp.

- When you are finished writing the help for the topic, press **End** to return to the Content Sensitive Help panel.

Figure 9-18 Editing Help Text

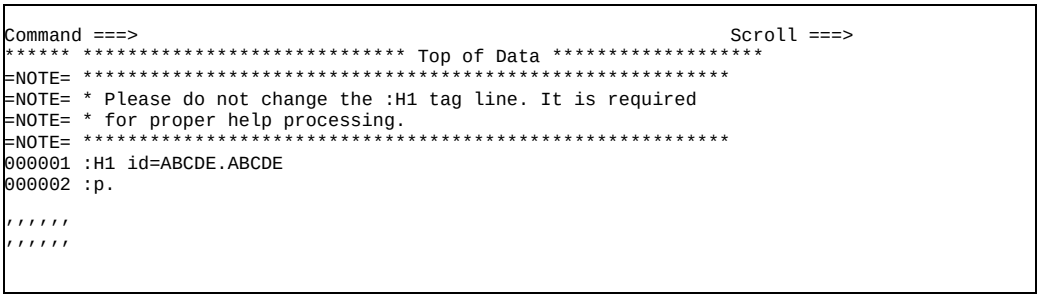

Table 9-6 lists the tags available for writing content-sensitive help.

Table 9-6 Tags Available for Writing Content-Specific Help

Tag	Description
:H1	Creates a heading. This tag is followed by an ID= attribute, which is automatically filled in with the same value specified in the Topic field of the Content-sensitive Help panel. Do not change this value. InTune relies on this value to find the correct help text. This value is followed by a period, followed by the title that is to appear in the help panel. The value you specify in the Content field of the Content-sensitive Help panel is automatically used as the title. To change the title, overtype this value.
:p.	Creates a blank line between paragraphs.

Table 9-6 Tags Available for Writing Content-Specific Help

Tag	Description
:dl.	Creates a definition list. Must be used with :dt. (topic) and :dd. (description) tags, which must be followed by the :edl. (end definition list) tag.
:ul.	Creates a bulleted list. Must be used with :li. (list item) tags, which must be followed by the :eul. (end unordered list) tag.
:hp1.	Highlights text following the tag. Use the :ehp1. tag after the text you want highlighted to resume normal text.
:xmp.	Creates text that shows an example. Text is displayed exactly as typed, including spaces. Must be followed by the :exmp. tag following the example text.
:note.	Creates a note. The note text must be followed by the :enote. tag.
:suggest.	Creates a suggestion. Text is highlighted in yellow. The suggestion text must be followed by the :esuggest. tag.
:hottip.	Creates a tip. The “InTune Tip” heading is highlighted in yellow. Text is highlighted in white. The tip text must be followed by the :ehottip. tag.
:warning.	Creates a warning. Text is highlighted in red. The warning text must be followed by the :ewarning. tag.

Content-Sensitive Help Example

Figure 9-19 shows the Content Help Addition window for an example topic.

Figure 9-19 Content Help Addition Window for Example

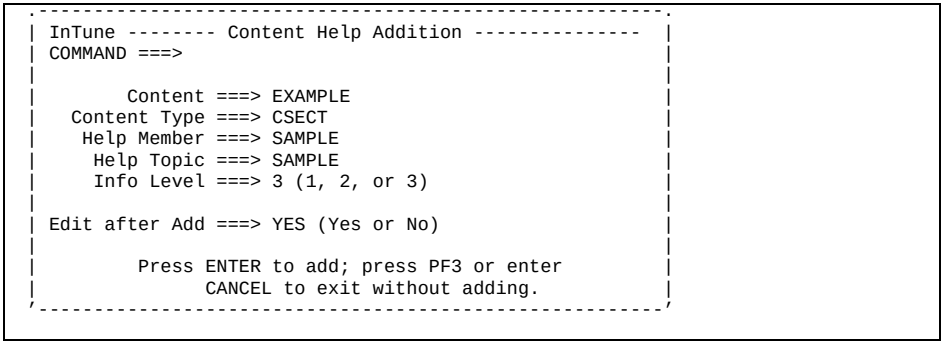

Figure 9-20 shows an example of how you would use the tags to create your own help text.

Figure 9-20 Using Tags to Format Help Text

```
:H1 id=SAMPLE.EXAMPLE
:p.
Here is an example of how you use the tags to write help text.
We'll start with a definition list:
:p.
:dl.
:dt.Term1
:dd.Explanation1
:dt.Term2
:dd.Explanation2
:edl.
:p.
Next we'll create a bulleted list:
:ul.
:li.Item1
:li.Item2
:eul.
:p.
:xmp.
 This is an example. It appears e  x actly as typed.
:exmp.
:p.
:note.
Here is an example of a note. The word :hp1.note:ehp1. is
highlighted.
:enote.
:p.
:suggest.
This is a suggestion. It is displayed in yellow.
:esuggest.
:p.
```

Figure 9-21 shows the help text as it is displayed on the screen.

Figure 9-21 Formatted Help Text

```
InTune             EXAMPLE                    HELP
Command ===>                       Scroll ===> PAGE
-------------------------------------------------

Here is an example of how you use the tags to
write help text. We'll start with a definition
list:

Term1          Explanation1
Term2          Explanation2

Next we'll create a bulleted list:
   o Item1
   o Item2

This is an example. It appears e   x actly as type

Note: Here is an example of a note. The word note
      is highlighted.

Suggestion:
  This is a suggestion. It is displayed in
  yellow.

InTune TIP:
```

Figure 9-22 shows the example displayed on the Content-Sensitive Help panel.

Figure 9-22 Content Sensitive Help Panel with Example

```
InTune ------------------ Content-sensitive Help ---------- ROW 1 to 11 of 245
COMMAND ===>                                                 SCROLL ===> CSR

Primary commands: ADD

   Line commands: CE - Copy entry  DE - Delete entry  UE - Update entry
                  BT - Browse help text  ET - Edit help text

LC Field Specific Contents          Type     Help     Help     I S LAST
                                             Member   Topic    L L USER
   ___________________________________ ________ ________ ________ _ _ ________
>-------------------------------------------------------------------------------
__ .OTHERWT                         CSECT    TUCCSALL OTHER    3 D INTUNE
__ .PAGEWT                          CSECT    TUCCSALL PAGEWT   3 D INTUNE
__ .SWAPWT                          CSECT    TUCCSALL SWAPWT   3 D INTUNE
__ .USER                            CSECT    TUCCSALL USER     3 D INTUNE
__ EXAMPLE                          CSECT    SAMPLE   SAMPLE   3 U ABCDEF
__ IGG019AF                         CSECT    TUCCSIGG IGG019AF 3 D INTUNE
__ IGG019AQ                         CSECT    TUCCSIGG IGG019AQ 3 D INTUNE
__ IGG019AR                         CSECT    TUCCSIGG IGG019AR 3 D INTUNE
__ IGG019BQ                         CSECT    TUCCSIGG IGG019BQ 3 D INTUNE
__ IGZCIN1                          CSECT    TUCCSIGZ IGZCIN1  3 D INTUNE
```

Displaying InTune and Environmental Information

The InTune Environment panel displays InTune and environmental information that should be examined with the assistance of BMC Software Customer Support personnel. It contains information such as the maintenance level, storage blocks, and the OS/390 environments in which the server and client are running. Figure 9-23 shows an example of the panel.

To display the InTune Environment panel, select Option I from the Administration Options Menu.

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Figure 9-23 InTune Environment Panel

```
InTune ---------------------- InTune Environment ----------------- Top of data
 COMMAND ===>
                                                                        More:     +
InTune Information
Server ID              : INTUNE         Job Name               :
Status                 : ACTIVE         JES Job ID             :
Server Release         :                ASID                   :
REXX Mode              : COMPILED       Client PTF Level       : BPM7589
Server GIF name        :
Client GIF name        : TUN22.TUN22ENG.GIF

MVS Information
MVS system name  . . . : SJSC
SMFID  . . . . . . . . : SJSC
MVS  . . . . . . . . . : SP6.0.9
MVS FMID . . . . . . . : JBB6609
OS/390 release . . . . : OS/390 02.09.00
CPU  . . . . . . . . . : 9672-A5
CPU serial number  . . : 030204

TSO and ISPF Information
TSOE . . . . . . . . . : 2.06.0
ISPF (internal number) : 4.8
OS/390 ISPF component  : ISPF FOR OS/390 02.08.00

Misc. Component Information
RACF . . . . . . . . . : 2.60.8
DFHSM. . . . . . . . . : 1.05.0
Primary JES ID . . . . : JES2
Primary JES Release  . : OS 2.8.0

SMS Information
DFSMS . . . . . . . . .  1.5.0
Subsystem ID . . . . . : SMS

InTune Internal Information
PSX Address            : 00000000       SVC 42 ICB             :
PSD Address            : 00000000       SVC 42 ICB STATUS      :
PSD Address            : 00000000       SVC 42 ICB STATUS      :
OMB Address            : 00000000       SVC 42 Owning Server   :
Mon DS Prefix          :                SVC 42 ICB Intercept   :
ASCB Address           :                SVC 42 Old Address     :
                                        SVC 42 Jobsteps        :
                                        SVC 42 Matches         :
```

Table 9-7 lists the InTune specific information on this panel.

Table 9-7 InTune Information on the InTune Environment Panel.

Field	Description
Server ID	The alphanumeric identifier for the InTune Server Space.
Status	The status of the InTune Server Space. Possible values are: • Active • Inactive
Server Release	The release level of the InTune Server Space.

Table 9-7 InTune Information on the InTune Environment Panel.

Field	Description
Rexx mode	Indicates whether InTune is running in compiled or interpreted mode.
Server GIF name	The dataset name of the Global Information File for the InTune Server Space.
Client GIF name	The dataset name of the Global Information File for the InTune TSO Client.
Job Name	The OS/390 job name of the InTune Server Space.
JES Job ID	The job number assigned by the Job Entry Subsystem (JES).
ASID	The number for the address space associated with the job.
Client PTF level	The latest PTF level of the InTune TSO Client.

Registering Source Program Listings

By registering source program listings, you allow InTune to relate program activity to high-level language statements, instead of only Csect offsets. When you register a program, you are requesting an InTune routine to read the listing of the compiled program and create a table, which is used during interactive analysis. You can register a program online with the InTune TSO Client, or offline using the sample InTune batch registration procedure *hilevel*.TNBATREG. You set up the batch registration procedure during installation using the AutoCustomization Facility.

When registering a program online through the TSO Client, you can chose to register the listings locally or globally. A listing that is registered locally is only available to the InTune TSO Client that performed the program registration; a listing that is registered globally is available to all InTune users. If a listing is registered both locally and globally, InTune selects one, based on the following rules:

- If the monitor you are analyzing is a global monitor, InTune looks for a global registration. If one is not found, InTune issues a message.

- If the monitor you are analyzing is local to the TSO Client, InTune looks for a local registration. If a local registration is not found, InTune looks for a global registration for that program. If no registration is not found, InTune issues a message.

You may register program listings for Assembler, COBOL, PL/1, Fortran, IBM C/C++, and SAS C. There are two steps for registering program listings:

- Compiling the program
- Registering the listings

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Compiling the Program

Compile the program with specific options, as shown in Table 9-8. If you make changes to the program, you must recompile and reregister the program to maintain accuracy.

Note

The compilation step that produces the input to the registration routine must be the same as the compilation step that produces the object code seen by the InTune measurement routines. If the compilation steps are not the same, the statement numbers identified by the InTune analysis routines could be incorrect.

Table 9-8 Compiler Options Required for Program Registration

Compiler	Levels Supported	Required Options
Assembler	VS, F, G, H	LIST ESD
COBOL	VS, ANSI Versions 2, 3, 4	SOURCE PMAP VERB
COBOL	VS COBOL II COBOL for OS/390 and VM	SOURCE NOLIST OFFSET NONUMBER **OR** SOURCE LIST NOOFFSET
COBOL	CA-OPT 5.3 CA-OPTII 1.1	SOURCE NOCLIST PMAP
PL/1	2.3.0	ESD NOINSOURCE OFFSET MAP STMT LIST or NOLIST Note that if you use NOLIST, you might not be able to register listings that have imbedded procedures. In this case, recompile with the LIST option.

Table 9-8 Compiler Options Required for Program Registration

Compiler	Levels Supported	Required Options
Fortran	2.2.0 and above	XREF LIST MAP
IBM C/C++	MVS/ESA: 3.2 and above OS/390: 1.1 and above	LIST
SAS C	5.0 and above	OMD

Listing Managers

InTune supports listings stored in IBM PDS and PDS/Es, Compuware's DDIO, and Computer Associates Librarian and Panvalet files. If your listings are stored in DDIO format, registration requires that they be in the DDIO Enhanced Listing format and that the program be listed with the following DDIO options:

```
COBOL (OUTPUT(PRINT))
COBOL (OUTPUT (NODDIO))
PROCESSOR (OUTPUT(DDIO))
PROCESSOR (TEXT(ALL))
DDIO (OU(NOLI, NOPM, NOOF, NOCL, NOXR, NODM, FIND, CO))
```

If you recompile a program, you must reregister it with InTune to maintain accurate statement information.

Registering IBM C/C++ Listings with Language Environment Support

IBM C/C++ support is implemented in a similar manner to the other compilers. One notable exception is the need to enter the name of the load module that reflects the IBM C/C++ listing. Unlike non-Language Environment compiler support where a listing is related to a Csect, Language Environment (LE) support relates a listing to a load module, not a Csect. Depending on your site's data set naming standards, the load module name might not match the listing member name. During registration, a small pop-up panel appears, asking you to specify the load module name.

Note

When you register a listing from the Histogram panel, the pop-up panel does not display. This is because InTune automatically assigns the load module name from the Histogram report to the listing for you.

When analyzing an IBM C/C++ program with LE, InTune automatically detects that the listing is registered to the load module, instead of the Csect, and makes the proper adjustments to the analysis reports. No intervention during analysis is required on your part.

Registering the Listings

1. Select one of the following menu options:

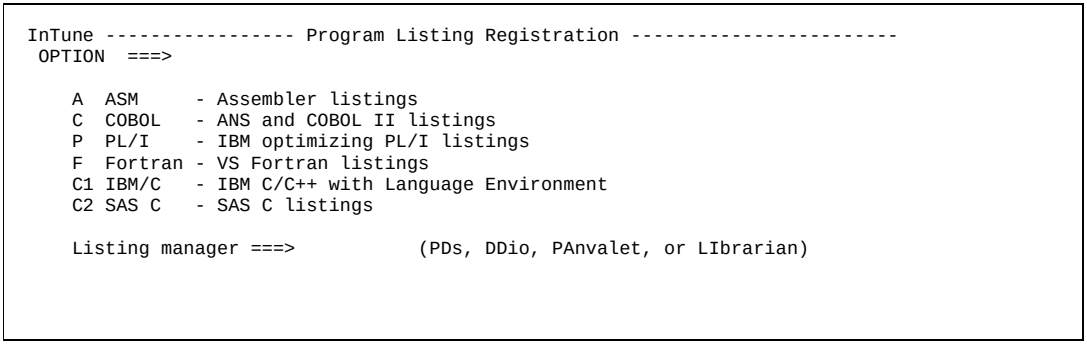
   — Option 3 from the Primary Option Menu.

   — Option 5 from the Administration Option Menu (for global registrations).

   — Option 3 from the Global Monitoring Menu (for global registrations)

The Program Listing Registration panel (Figure 9-24) is displayed

Figure 9-24 Program Listing Registration Panel



2. To select the language of the program you wish to register, type the appropriate code in the Option field.

3. To select the listing manager you want to register, type the first two letters of the manager. The listing manager indicates where the listings reside.

   - **PD**s - Listings are stored in PDSs or PDSEs.

   - **DD**io - Program listings are stored in Compuware's Common Services DDIO file. You must know the name of the listing and the DDIO file in which it resides before you can register the program.

Note

Only COBOL listings can be registered from DDIO files.

   - **PA**nvalet - Program listings are stored and managed by CA-Panvalet. You must know which member and library the program listing is in before it can be registered.

   - **LI**brarian - Program listings are stored and managed by CA-Librarian. You must know which member and library the program listing is in before it can be registered.

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Depending on the language you select and the listing manager, a panel showing all COBOL, Assembler, PL/1, Fortran, IBM C/C++, or SAS C programs currently registered with InTune is displayed. From this panel, you can either add new listings or delete old listings. If you add a listing that already exists, the new listing replaces the existing listing.

4. Press **Enter** to register the listings. A message will indicate when the registration is complete.

Example: Registering Cobol Listings

1. Select Option C and any one of the listing managers.

2. Press **Enter**.

   The Registered Listings panel (Figure 9-25) is displayed.

Figure 9-25 Registered COBOL Programs

```
InTune --------- Registered Listings: COBOL      ------------- ROW 0 to 0 of 0
 COMMAND ===>                                                  SCROLL ===> CSR

 Primary commands: ADD, REBuild, ADDHelp

 Line commands: B - Browse  R - Register  D - Delete

 LC CSECT    Type   Dataset name

    ________ ______ ____________________________________________________________
 >-------------------------------------------------------------------------------
 ******************************** END OF TABLE ********************************
```

Table 9-9 describes the commands available for the Registered Listings panel.

Table 9-9 Registered Listings Panel Commands

Command	Description
ADD	Registers a new listing. InTune prompts for the data set in which the listing resides.
REBuild	Registers all listings that are displayed in the administration panel. This is helpful when working with a larger application.

Table 9-9 Registered Listings Panel Commands

Command	Description
ADDHelp	Invokes the Content-sensitive Help application to update or create a help entry for the selected content.
Browse	Displays the registered listing.
Register	Reregisters the listing. Use this option if you modify a program after registering it with InTune.
Delete	Causes InTune to delete the listing registration table for the selected program.

Table 9-10 describes the fields on the Registered Listings panel.

Table 9-10 Registered Listings Panel Fields

Field	Description
CSECT	Displays the Csect name of the program you have registered. The name is extracted from the listing and might not be the member name of the listing data set.
Type	Displays the compiler type which created the listing.
Dataset name	Displays the data set name where the program listing resides.
VOLSER	Displays the Volume serial number of the listing data set. The serial number is displayed only for uncataloged data sets.
CompDate	Displays the date the listing was compiled. This date is extracted from the listing.
CompTime	Displays the time the listing was compiled. This date is extracted from the listing.
Listing Manager	Listing manager in which the program listing resides.

3. Type ADD in the COMMAND field and press **Enter**.

   The COBOL Map Resolution panel (Figure 9-26) is displayed.

Note

Each listing manager has its own map resolution panel.

Figure 9-26 COBOL Map Resolution in the PDS List Manager Panel

```
InTune ----------------- COBOL Map Resolution ------------------------
COMMAND ===>

Specify Listing Dataset(s) below:
   Project ===>
   Group   ===>          ===>          ===>          ===>
   Type    ===>
   Member  ===>

Other partitioned or sequential dataset:
   Dataset name   ===>
   Volume serial  ===>         (If not cataloged)


Press ENTER key to select members
Enter END command to cancel.
```

4. **PDS only:** If you select the PDS listing manager, type the name of the data set containing the listings and press **Enter**.

   The Member List panel for PDS (Figure 9-27) is displayed.

Figure 9-27 Member List Panel

```
InTune -------------------------- Member List -------------- ROW 1 to 21 of 28
COMMAND ===>                                                 SCROLL ===> CSR

Dataset: TUN.TEST.COB2LIST

Line commands: S - Select  B - Browse

                                                    Change   Change
LC Name     Completion                VV MM Created  Date     Time   User
   ________ _________________________ __ __ _______ ________ ______ ____
>-------------------------------------------------------------------------
-
__ ACCT00
__ ACCT00#
__ ACCT01
__ ACCT02
__ CAC080
__ COBDIV00
```

Type S next to the source module names you want to register with InTune and press Enter. A message will indicate when the listing has been registered. It might take several seconds for the source member to complete registration.

Table 9-11 describes the fields in the Member List panel.

Table 9-11 Member List Panel Fields

Field	Description
Name	Displays the name of the member in the listing data set. This name is specified during the execution of the compiler on the SYSPRINT DD statement.
Completion	Displays the status of the listing registration. The text may be one of the following: • Successfully registered • Not a program listing • No offset map found
VV	Displays the version level for the member when changed with ISPF EDIT. If the member was not changed using ISPF EDIT, this field is blank.
MM	Displays the modification level for the member when changed with ISPF EDIT. If the member was not changed using ISPF EDIT, this field is blank.
Created	Displays the time this member was created using ISPF EDIT. If the member was not created using ISPF, this field is blank.
Change Date	Displays the date the member was last modified or created using ISPF EDIT. Blank if the member was not created or modified using ISPF EDIT.
Change Time	Displays the time the member was last modified or created using ISPF EDIT. If the member was not created or modified using ISPF EDIT, this field is blank.
User	Displays the TSO user ID of the user that created or last modified this member using ISPF EDIT. If the member was not created or modified using ISPF EDIT, the field is blank.
Size	Displays the number of lines the member currently contains. If the member was not changed using ISPF EDIT, this field is blank.
Init	Displays the initial size of the member when it was created using ISPF EDIT. If the member was not created using ISPF EDIT, this field is blank.
Mod	Displays the number of lines that are marked as modified when using ISPF EDIT. If the member was not changed using ISPF EDIT, this field is blank.

5. **DDIO, Panvalet, or Librarian:** If you select Option C and the DDIO, Panvalet, or Librarian listing manager, a COBOL Map Resolution panel similar to the following (Figure 9-28 on page 9-43) is displayed. Specify the data set that contains the program listing and press **Enter**. It may take several seconds for the source member to complete registration.

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Figure 9-28 COBOL Map Resolution in the DDIO List Manager Panel

```
InTune ------------------- COBOL Map Resolution      -------------------------
 COMMAND ===>

 Specify DDIO listing data set and member below:
   Listing data set choice  ===>    (1 through 8)
               Member name  ===>

       Listing data sets 1  ===>
                         2  ===>
                         3  ===>
                         4  ===>
                         5  ===>
                         6  ===>
                         7  ===>
                         8  ===>

 Press ENTER to register listing
 Enter END to cancel
```

Using Interactive Analysis with Registered Programs

Once you have registered a program, you can view a Csect's source code directly by using the **L**isting line command on the Delay Locations, Histogram, and CodeView interactive analysis panels. InTune also provides statement references in the Stmt field on the Delay Locations and Histogram panels. Refer to Chapter 7, "Analyzing Monitor Data" for more information. Following are several examples:

Figure 9-29 shows the Stmt information on the Delay Locations panel, which is displayed when you issue the **A**ddress line command for a specific delay category on the DelayView panel.

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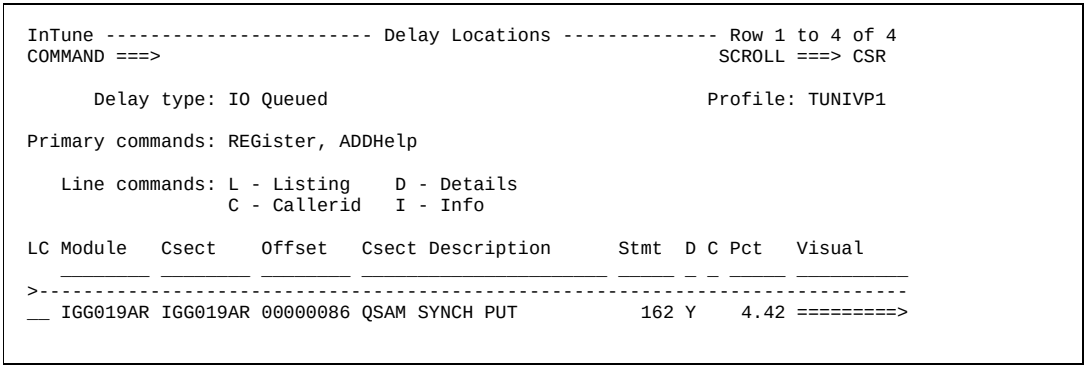
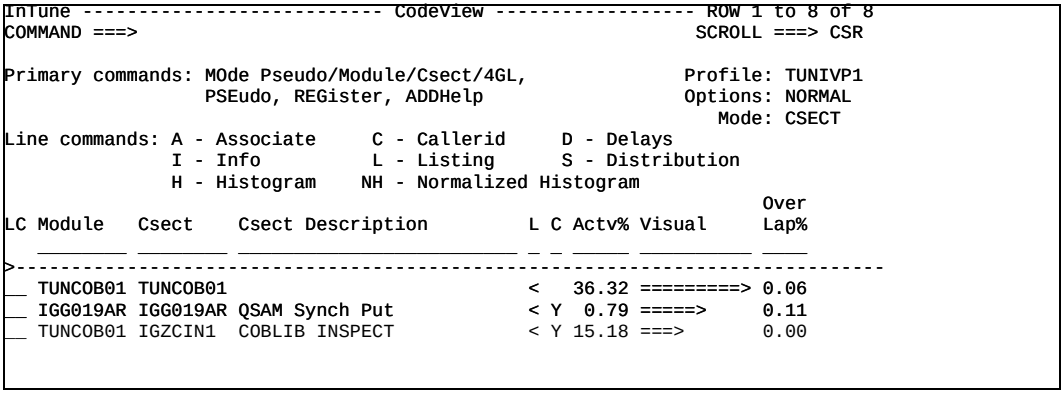
Figure 9-29 Delay Locations Showing Stmt Number



```
InTune ------------------------ Delay Locations -------------- Row 1 to 4 of 4
COMMAND ===>                                                   SCROLL ===> CSR

      Delay type: IO Queued                                  Profile: TUNIVP1

Primary commands: REGister, ADDHelp

   Line commands: L - Listing    D - Details
                  C - Callerid   I - Info

LC Module   Csect    Offset   Csect Description      Stmt  D C Pct   Visual
   ________ ________ ________ _____________________ _____ _ _ _____ __________
>-------------------------------------------------------------------------------
__ IGG019AR IGG019AR 00000086 QSAM SYNCH PUT          162 Y    4.42 =========>
```

Figure 9-30 shows the CodeView panel. Issue the **L**isting line command to display the source code listing.

Figure 9-30 CodeView Panel Showing Csects with Activity



```
InTune --------------------------- CodeView ------------------ ROW 1 to 8 of 8
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: MOde Pseudo/Module/Csect/4GL,              Profile: TUNIVP1
                  PSEudo, REGister, ADDHelp                  Options: NORMAL
                                                                Mode: CSECT
Line commands: A - Associate     C - Callerid     D - Delays
               I - Info          L - Listing      S - Distribution
               H - Histogram    NH - Normalized Histogram
                                                                 Over
LC Module   Csect    Csect Description         L C Actv% Visual     Lap%
   ________ ________ ________________________ _ _ _____ __________ ____
>-------------------------------------------------------------------------------
__ TUNCOB01 TUNCOB01                          <   36.32 =========> 0.06
__ IGG019AR IGG019AR QSAM Synch Put           < Y  0.79 =====>     0.11
__ TUNCOB01 IGZCIN1  COBLIB INSPECT           < Y 15.18 ===>       0.00
```

Registering Listings During Interactive Analysis

When measuring the performance of programs in online subsystems consisting of many different load modules with each module possibly containing several Csects, you seldom need to register every Csect. If you find you need Csect information on a specific module, you can register the module when using the following Interactive Analysis panels:

- Delay Locations (Figure 7-8 on page 7-23)
- CodeView (Figure 7-17 on page 7-32)
- Histogram (Figure 7-18 on page 7-35)
- Callerid (Figure 7-13 on page 7-28)

Comparing Dates, Sizes and Compiler Types

InTune compares the dates, Csect sizes, and compiler types of registered listings to the monitored program when the Histogram line command is entered from the Code View panel.

Note

Registered listing dates are stored in the following format: *yyyy/mm/dd*

If there is a mismatch, a warning message, such as the one below, is issued:

Dates do not match

Press **PF1** to get additional information; for example:

Dates do not match - The date of the running program, 1999/10/29, and the registered listing, 1999/12/07,do not match. This may cause misleading or inaccurate information to be displayed.

Note

InTune does not attempt to validate Csect sizes for COBOL VS, CA-OPTIMIZER 5, or CA-OPTIMIZER/II.

10

InTune Open Application Program Interface

This chapter discusses the following topics:

What Is the InTune Open Application Program Interface? 10-2
Using TUNCALL. 10-2

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What Is the InTune Open Application Program Interface?

In addition to defining and invoking monitor sessions online using the InTune TSO Client, you can start a session using InTune's Open Application Program Interface (Open API). This allows you to monitor an application when conditions are most critical, including

- When a critical performance threshold is exceeded.
- When a program is executed under specific conditions.
- If you are using a console automation tool.
- If you are using a program change control system.

TUNCALL Program

The TUNCALL program is used to define and start a monitoring session. TUNCALL can be used in three different ways:

- As a TSO command
- As a batch job
- As a called program

Global Monitor Definitions

The information collected when using TUNCALL is analyzed and administered using Global Monitor Definitions. Because monitors invoked using TUNCALL are not assigned to a specific user, the data is written to the Global Monitors data set.

Using TUNCALL

The TUNCALL program is located in *hilevel*.BBLINK. You may place TUNCALL in your Link Pack Area (LPA).

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TUNCALL Syntax

TUNCALL uses a character string to determine what function is to be performed. The syntax, as shown in Table 10-1, is the same for all three methods of invocation:

Table 10-1 TUNCALL Command Syntax Diagram

SERVERID	{,MONITOR}	{INVOKE} {*keyword*(*operand*)} {STATUS} {TOKEN(*token*)} {CANCEL} {TOKEN(*token*)}

SERVERID is the name of the InTune Server Space that is to process the command. This is not necessarily the server which will perform the monitor.

MONITOR supports three sub-functions:

- INVOKE - to schedule a new monitor session.
- STATUS - to return the status of a monitor session.
- CANCEL - to cancel or terminate a running monitor session or a waiting request.

MONITOR INVOKE Command

The MONITOR INVOKE command supports a series of parameters. Unless you specify a keyword, default values are used. Refer to “Changing the Global Monitor Definition Default Criteria” on page 9-3 for information about how to define default values. Table 10-2, “Parameters for Invoking TUNCALL,” on page 10-5 lists the available keywords and operands for MONITOR INVOKE.

TSO only: Any messages issued are written back to the terminal, but may be trapped using TSO’s OUTTRAP facility.

MONITOR STATUS Command

The MONITOR STATUS command supports one required keyword. You must specify the token associated with the monitor request. A MONITOR STATUS request returns one of the following return codes in ISPF variable TUNRC:

RC = 0	TUNRC=0	Status is ‘Waiting’
RC = 16	TUNRC=4	Status is ‘Active’
RC = 16	TUNRC=8	Status is ‘Inactive’
RC = 16	TUNRC=12	Status is ‘Canceled’
RC = 16	TUNRC>12	Status is ‘Unknown’

MONITOR CANCEL Command

The MONITOR CANCEL command supports one required keyword. You must specify the token associated with the monitor request. A MONITOR CANCEL request returns one of the following return codes in ISPF variable TUNRC:

RC = 0	TUNRC=0	Monitor is stopped
RC = 16	TUNRC=8	Monitor not found
RC = 16	TUNRC>8	Server not found

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Monitor Tokens

A numerical token is assigned to each monitor request and is returned back from the API call. A token is a unique identification of the monitor request. The number is incremented by the InTune Server Space, so that all requests are unique.

Table 10-2 Parameters for Invoking TUNCALL

KEYWORD(operand)	Description
PROFILE(name)	Specify a name for the Monitor Profile. This identifies the profile definition. Typically, this will be the name of the job to be monitored. If not specified, the JOBNAME is used as the monitor profile name. The profile will be added to the list of Global Monitor Definitions. • If the monitor profile already exists, all other options are used as modifiers to the Monitor Profile definition. • If the monitor profile does not exist, a new monitor profile is created with default values. After the new monitor profile is created, all options are used as modifiers to that new monitor profile.
JOBNAME(name)	Specify the name of the job to be monitored. If not specified, the PROFILE name is used as the JOBNAME. You must specify either PROFILE or JOBNAME. You may specify both.
ASID(number)	Specify the address space number of the job to be executed, if there are multiple address spaces with the same job name.
PROCSTEP(name)	Specify the name of the procedure step to monitor, if the jobstep uses a cataloged or instream procedure.
STEPNAME(name)	Name of the job step to monitor. Within a multistep job, you must specify either a STEPNAME, a PROCNAME, or a PROGRAM to select the correct program. If the target of the STEPNAME is a cataloged or instream procedure, you must further define the step you want to monitor using PROCNAME.
PROGRAM(name)	Specify the name of the program to monitor. If you do not specify the Program name, you must specify the STEPNAME, as well as PROCNAME when appropriate.
MONDSN(dataset)	Specify the name of the data set to receive the monitor data. If the data set does not yet exist, InTune automatically allocates it. Do not use quotation marks. Refer to “Naming Monitor Data Sets” on page 2-56 and Table 5-3, “Monitoring Criteria Fields,” on page 5-9 for more information.

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Table 10-2 Parameters for Invoking TUNCALL

KEYWORD(operand)	Description
INCTASK1(name) INCTASK2(name) INCTASK3(name) INCTASK4(name)	Use the INCTASK parameter to include only certain tasks for sampling in a multitasking environment. Specify up to four names of subtasks to include in the monitor report. This parameter supports the use of the * wildcard character to match multiple characters and the + wildcard character to match any single character.
EXCTASK1(name) EXCTASK2(name) EXCTASK3(name) EXCTASK4(name)	Use the EXCTASK parameter to exclude certain tasks for sampling in a multitasking environment. Specify up to four names of subtasks to exclude in the monitor report. This parameter supports the use of the * wildcard character to match multiple characters and the + wildcard character to match any single character.
ELAPSTIME(seconds or 'STEP')	Specify the elapsed time in seconds to monitor the job. Refer to "Determining Number of Samples to Collect and Total Time to Monitor" on page 5-14 for more information. Specify STEP to gather information about an entire jobstep when you want to monitor for the entire duration of the step.
SAMPLECNT(number)	Specify the total number of samples to collect. Refer to "Determining Number of Samples to Collect and Total Time to Monitor" on page 5-14 for more information.
SAMPDELAY(seconds)	Specify a delay in seconds following the start of the target job step before InTune begins sampling to skip monitoring the initialization functions within the jobstep.
WINSTART(time) WINEND(time)	Specify a starting and ending time with the format HHMM to define a window when the monitor session is to begin looking for a matching job. This allows you to sample the target job only during a specific period of time.
TRAN1(name) TRAN2(name) TRAN3(name) TRAN4(name)	Specify up to four CICS or IMS transaction names to monitor. This will limit sampling to only those transaction types in which you are interested. This field supports the use of the * wildcard character to match multiple characters and the + wildcard character to match a single character.
TERM1(name) TERM2(name) TERM3(name) TERM4(name)	Specify up to four CICS or IMS terminal IDs to monitor. This will limit sampling to only those terminal IDs in which you are interested.

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Table 10-2 Parameters for Invoking TUNCALL

KEYWORD(operand)	Description
USERID1(name) USERID2(name) USERID3(name) USERID4(name)	Specify up to four CICS or IMS user IDs to monitor. This will limit sampling to only those user IDs in which you are interested.
TASKLIB(ddname)	Specify the name of an alternate DDNAME from which the monitored program loads other programs. InTune requires the location of program load modules to obtain the information required to display Csect offsets during analysis. InTune automatically searches the following libraries to obtain program information: JOBLIB, STEPLIB, DFHRPL (CICS only), DFSRESLB (IMS only), ISPLLIB (SPF only), Link list data set, LPA list data set
JOBCARD1(string) JOBCARD2(string) JOBCARD3(string) JOBCARD4(string)	Specify one to four images of your JOBCARD.
PREFIX(name)	The TSO prefix value for both the monitor data set name and batch jobs.
BATCHREP(string)	Specify YES to generate batch reports. Specify NO for no batch reports. Refer to Chapter 11, “Generating InTune Batch Reports” for more information.
USEREXIT1(name) USEREXIT2(name)	Specify the names of a user exit to be called; for example, to measure Adabas or CA-Datacom.
TARGSYS1(name) TARGSYS2(name) TARGSYS3(name) TARGSYS4(name)	Specify the names of a specific system where the monitor request is to be sent. If not specified, the monitor request will be broadcast to all systems in the sysplex.

Invoking a Monitor from a TSO Command, CLIST, or REXX Exec

You may invoke a monitor directly from TSO or use a CLIST or REXX EXEC. Use the following syntax:

TUNCALL '*ServerID*, MONITOR INVOKE PROFILE(*name*)'

Example

For job "PAYPROD1" running on any system, using default criteria:
TUNCALL 'INTUNE, MONITOR INVOKE PROFILE(PAYPROD1)'

Example

For job "PAYPROD1", program name xxx, running on any system, for the entire duration of the job step:
TUNCALL 'INTUNE, MONITOR INVOKE PROFILE(PAYPROD1) PROGRAM(xxx) ELAPSTIME(STEP)'

Example

For job "PAYPROD1", sampling only transactions xxx and yyy, running on system zzz:
TUNCALL 'INTUNE, MONITOR INVOKE PROFILE(PAYPROD1) TRAN1(XXX) TRAN2(YYY) TARGSYS1(ZZZ)'

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Invoking a Monitor from a Batch Job

You may start a monitoring session using a batch job. Use the following example:

```
//JOBNAME JOB (ACCT),'CALL INTUNE',CLASS=A,MSGCLASS=A
//*
//TUNCALL EXEC PGM=TUNCALL,
//  PARM='INTUNE,MONITOR INVOKE PROFILE(PAYPROD1)'
```

You can also route the message and control file output to a file instead of the console, by using TUNPRINT. The following example :

```
//JOBNAME JOB (ACCT),'CALL INTUNE',CLASS=A,MSGCLASS=A
//*
//TUNCALL EXEC PGM=TUNCALL,
//TUNPRINT DD SYSOUT=*
```

The following example uses TUNIN to invoke a monitor that contains a large number of parameters. You can also invoke multiple monitors with this method.

```
//JOBNAME JOB (ACCT),'CALL INTUNE',CLASS=A,MSGCLASS=A
//*
//TUNCALL EXEC PGM=TUNCALL,
//TUNPRINT DD SYSOUT=*
//TUNIN DD*
//  INTUNE -
//  MONITOR -
//  INVOKE -
//  PROFILE(PAYPROD1)
...

The following example uses TUNIN to invoke a group of monitors.
//JOBNAME JOB (ACCT),'CALL INTUNE',CLASS=A,MSGCLASS=A
//*
//TUNCALL EXEC PGM=TUNCALL,
//TUNPRINT DD SYSOUT=*
//TUNIN DD*
```

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```
//  INTUNE, GROUP INVOKE GROUP(GRPPROD)
//          PREFIX(TSOPREF)
```

Invoking a Monitor from within a Program

When invoking InTune as a called program, you must pass it the following parameter list (Table 10-3):

Table 10-3 TUNCALL Parameter List

Parameter	Value	Description
Parameter 1	+0	The address of the parameter list format. This must point to a fullword of 1.
Parameter 2	+4	The address of the command to be processed.
Parameter 3	+8	The address of a fullword integer containing the length of the command to be processed.
Parameter 4	+12	For MONITOR INVOKE requests, this must contain the address of a 16 byte area where the Monitor Session Token is to be returned. Otherwise, this must be zero.
Parameter 5	+16	Two consecutive 112 byte areas where either one or two messages will be returned.
Parameter 6	+20	Address of a fullword to contain the return code.
Parameter 7	+24	Address of a fullword to contain the optional reason code. The high level bit indicating end-of-parameter-list must be set ON for this parameter.

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When using TUNCALL, you must check both R15 and Parameter 6. The return code in R15 indicates if the command string was successfully passed to the proper InTune Server on the proper system. The return code in Parameter 6 indicates if the command was processed successfully. Table 10-4 describes the return codes in R15.

Table 10-4 TUNCALL Return Codes

Code	Description
0	Command successfully routed to the proper InTune Server and system.
8	Command was routed successfully but completed with error. Check the return and reason codes in parameter list for more detail. Messages will also be present.
12	Insufficient storage to process request.
16	InTune Server found, but Open/InTune was not active within the Server.
20	Abend occurred. A Logrec entry has been recorded.
24	Internal control block error. Please contact Boole and Babbage Technical support for assistance.
28	InTune Server was not found.
Other	Contact BMC Software Technical support for assistance.

Assembler Example

```
...
LA          R14,=F'1'         Parameter List Type
LA          R15,CMD           Point to command.
LA          R0,CMDL           Point to command length.
LA          R1,RETOKEN        Point to area to receive token.
LA          R2,MSGS           Point to message areas.
LA          R3,OIRC           Point to return code area.
LA          R4,OIRS           Point to reason code area.
STM         R14,R4,PLIST      Save parameter list.
OI          PLIST+24,X'80'    Mark end of Parameter list.
LA          R1,PLIST          Point to start.
LINK        EP=TUNCALL        invoke TUNCALL.
LTR         R15,R15           Work ok?
CMD         DC                C'MONITOR  INVOKE PROFILE(PAYPROD)'
CMDL        DC                A(L'CMD)
RETOKEN     DC                CL16' '
MSGS        DC                0CL224' '
MSG1        DC                CL112' '
MSG2        DC                CL112' '
OIRC        DC                F'0'
OIRS        DC                F'0'
PLIST       DC                7A(0)
...
```

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Generating InTune Batch Reports

This chapter explains how to set up and generate InTune batch reports. These reports contain similar information to InTune's Interactive Analysis panels. You can generate batch reports automatically each time you invoke a monitor, or anytime after a monitor has collected data.

This chapter also contains information about how to use the InTune Spreadsheet Converter.

This chapter discusses the following topics:

Generating Batch Reports Automatically. 11-2
Submitting a Job to Generate Batch Reports 11-2
Setting Up a Batch Report Definition 11-3
Creating InTune Spread Sheet Reports 11-8

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Generating Batch Reports Automatically

You can generate batch reports automatically each time you invoke a monitor definition.

1. In the Profile Parameters panel, specify Y in the Batch Reports field.

2. Set up a batch report definition for the job, as described in “Setting Up a Batch Report Definition” on page 11-3.

You can override the batch reports setting for a specific monitor definition by specifying YES or NO on the Monitor Criteria panel (see Figure 5-2 on page 5-9).

Note

If you issue the Stop line command against a monitor request, the batch reports will not be generated.

Submitting a Job to Generate Batch Reports

You can generate batch reports any time after you invoke the monitor and data collection has completed.

1. From the Monitor Definition panel, type B in the LC field next to the profile for the job.

2. Press **Enter**. The Batch Report panel is displayed.

3. Set up a batch report definition for the job, as described in “Setting Up a Batch Report Definition”.

4. Type SUBmit in the COMMAND field. A message will appear indicating that the job has been submitted.

5. Press **End** to return to the Monitor Definition panel.

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Setting Up a Batch Report Definition

You can set up the Batch Report panel for a job at any time. The default values for batch reports may be set globally. Refer to Chapter , “”. Global defaults can be changed for each user through the Profile Parameters panel.

1. From the Monitor Definition panel, type B next to the profile name of the job for which you want to generate batch reports.

2. Press **Enter**.

   The Batch Report panel (Figure 11-1 on page 11-4) is displayed.

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Figure 11-1 Batch Report Panel

```
InTune ------------------------ Batch Report -------------------------------
COMMAND ===>
                                                          Profile: TUNIVP1
                                                                 More:     +
  Reporting options
    Analysis option   ===> NORMAL         Monitor History   ===> Y
    Title             ===>
    TaskView          ===> Y              TranView          ===> Y
    DelayView         ===> Y              CodeView          ===> N
    DataView          ===> N              Linklist          ===> N
    ModView           ===> N              PoolView          ===> N

  Options for TaskView
    Code Detail       ===> N              Delay Detail      ===> N
    Task  1           ===> *              Task 2            ===>
    Task  3           ===>                Task 4            ===>

  Options for DelayView
    Delay details     ===> ON

  Options for CodeView
    All or top 5      ===> N              CodeView mode     ===> CSECT
    Histogram Csect 1 ===>                Histogram Csect 2 ===>
    Histogram Csect 3 ===>                Histogram Csect 4 ===>

  Options for DataView
    DB2 Code Detail   ===> N

  Options for TranView
    Code Detail       ===> N              Delay Detail      ===> N
    Transaction 1     ===> *              Transaction 2     ===>
    Transaction 3     ===>                Transaction 4     ===>

  JES Parameters
    Lines per page    ===> 66             Sysout class      ===> *
    Column width      ===> 132            Sysout form       ===>
    Destination       ===>

  Job Cards
    ===> //TUNBATMB JOB (3890),'INTUNE BATCH REPORT',
    ===> //  CLASS=F,MSGCLASS=R,NOTIFY=&SYSUID
    ===> //*
    ===> //TUNBAT JCLLIB ORDER=BMVJJM.JCL.CNTL

Scroll UP or DOWN for more options.  Enter SUBmit to submit a batch job,
press END to exit and save changes, or enter CANCEL to exit without saving.
```

3. Specify the report title, report format, output destination, and the reports you want to include.

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Table 11-1, “Report Definition Fields,” on page 11-5 describes the fields in the Report Definition panel.

Table 11-1 Report Definition Fields

Field Name	Description
Reporting Options	
Analysis option	Specify one of the following values: **NORMAL -** Information which is not directly related to the target application is eliminated. Data is reported as follows: • Samples related to delay categories such as Waiting for CPU, LPAR delay, and Swap delay are omitted from reports. • Delayview, TimeView, Dataview, and Modview show all relevant delays for the application. All relevant samples, both active and wait, are reported. • CodeView and related histograms report only active samples, to emphasize the most CPU-intensive portions of the program code. Wait samples, which can mask this activity, are not included. **ALL -** The results of the analysis reflect all samples obtained during the monitor period. **ACTIVE -** The results of the analysis reflect only those samples in which the program was actively using CPU. **WAIT -** The results of the analysis reflect only those samples in which the program was in a wait state.
Batch history	Specify Y (default) to generate the batch history report. Specify N for no report.
Title	Specify a unique title to appear at the top of each page of the report.
TaskView	Specify Y (default) to generate a TaskView report. Specify N for no TaskView report.
TranView	Specify Y to generate a TranView report. Specify N (default) for no TranView report.
DelayView	Specify Y (default) to generate a DelayView report. Specify N for no DelayView report.
CodeView	Specify Y (default) to generate a CodeView report. Specify N for no CodeView report.
DataView	Specify Y (default) to generate a DataView report. Specify N for no DataView report.
Linklist	Specify Y to include the names of the LINKLIST libraries for your installation as part of the DataView report. Specify N (default) for no LINKLIST information.

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Table 11-1 Report Definition Fields

Field Name	Description
ModView	Specify Y (default) to generate a ModView report. Specify N for no ModView report.
PoolView	Specify Y to generate a PoolView report. Specify N (default) for no PoolView report.
Options for TaskView	
Code Detail	Specify Y to generate the batch report. Specify N (default) for no report.
Delay Detail	Specify Y to generate the batch report. Specify N (default) for no report.
Task 1 – Task 4	Use these fields to select up to four specific tasks to appear in the following reports: • CodeView (including histograms) • DelayView • TaskView • TranView This field supports the use of the * wildcard character to match multiple characters and the + wildcard character to match any single character. If you want all tasks to appear, specify an asterisk (*) in this field. This is the default.
Options for TranView	
Code Detail	Specify Y to generate the batch report. Specify N (default) for no report.
Delay Detail	Specify Y to generate the batch report. Specify N (default) for no report.
Transaction 1 – Transaction 4	Use these fields to select up to four specific transactions to appear in the following reports: • CodeView (including histograms) • DelayView • TaskView • TranView This field supports the use of the * wildcard character to match multiple characters and the + wildcard character to match any single character. If you want all transactions to appear, specify an asterisk (*) in this field. This is the default.
Options for DelayView	
Detail	Specify ON if you want the DelayView report to contain detailed information about the delay causes. Specify OFF if you want the DelayView report to contain only high-level information about delay causes. The default is ON.
Options for DataView	

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Table 11-1 Report Definition Fields

Field Name	Description
DB2 Code Detail	Specify Y (default) to generate the DB2 Code Detail report. Specify N for no report.
Options for CodeView	
All or Top 5	Specify Y to create histograms for the five Csects showing the greatest activity or delay in CodeView. Specify A to create histograms for all Csects reported by CodeView. Specify N to suppress generation of histograms. Csect histograms are produced in order of descending activity.
CodeView mode	Specify the mode for CodeView batch reports. Possible modes are CSECT, MODULE, PSEUDO, or 4GL. The default is CSECT. See “Interactive Analysis Option 3 - CodeView” on page 7-31 for more information.
Histogram Csect 1- Histogram Csect 4	Specify up to four Csect names for which you want to create histograms.
JES Parameters	
Lines per page	Specify the number of lines on each page of the batch report. This field defaults to 66.
Column width	Specify the width of the batch reports. This field defaults to 132.
Sysout class	Specify an output destination for the batch reports. This field defaults to an asterisk (*). The asterisk (*) ensures that InTune generated reports use the same SYSOUT class as the jobcard.
Destination	Specify the one- to eight-character nodename of the JES destination. In addition, you can specify a one- to eight-character userid to which the SYSOUT report is written. If you specify a userid, it must follow the nodename and must be separated from the nodename with a period.
Sysout form	Specify a one- to four-character form name for the destination to which the report is written.
Job Cards	Contains your default ISPF jobcard. Modify these fields if necessary. Note that you can use the JCL ORDER statement to specify the library from which the batch programs are fetched, as shown in Figure 11-1 on page 11-4.

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Creating InTune Spread Sheet Reports

This section describes how to use the InTune Spreadsheet Converter (for Microsoft Excel 97) to export data from InTune's Interactive Analysis panels into Microsoft Excel spreadsheets. Once you have converted the data to Microsoft Excel spreadsheets, you will be able to use the functions within Microsoft Excel to create reports, graphs, and otherwise manipulate your data. For information about using Microsoft Excel, refer to your Microsoft Excel documentation.

This section contains information about:

- Installing the InTune Spreadsheet Converter for Microsoft Excel 97
- Generating InTune Spreadsheet Reports
- Maintenance and Support

Installing the InTune Spreadsheet Converter for Microsoft Excel 97

To use the InTune Spreadsheet Converter, you must first download and install the InTune Excel Add-In. Once installed, you can use simple menu commands to import the InTune Monitor data into Microsoft Excel spreadsheets.

This section describes how to install the InTune Excel Add-In:

- Download the InTune Spreadsheet Converter for Microsoft Excel 97
- Install the InTune Spreadsheet Converter for Microsoft Excel 97
- Remove the InTune Spreadsheet Converter for Microsoft Excel 97

Download the InTune Spreadsheet Converter for Microsoft Excel 97

The InTune Excel Add-In is delivered with InTune as a member (TUNSSC) in *hilevel*.BBSAMP. You need to download the InTune Excel Add-In to your PC.

1. Create a folder on your PC to be used for storing the spreadsheet converter and the converted reports.

2. Transfer the TUNSCC member of data set *hilevel*.BBSAMP to your PC using a file transfer program such and IND$FILE.

Note

To ensure Microsoft Excel will be able to read the file you must first transfer the file in BINARY format with NO CRLF codes and then use the XLA file extension when naming the new file.

3. Name the new file on your PC:

   TUNSSC.XLA

Install the InTune Spreadsheet Converter for Microsoft Excel 97

Installing the InTune Add-In

After the InTune Add-In is downloaded to your PC, it must be installed. Refer to your Microsoft Excel documentation for information if necessary.

1. Open Microsoft Excel (Office97 or later).

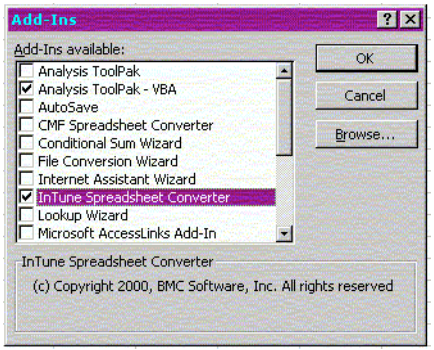
2. Choose **Tools=> Add-Ins**.

3. Click the **Browse** button on the Add-Ins window.

4. Navigate to the directory where you installed the Add-In and Select **TUNSSC.XLA**.

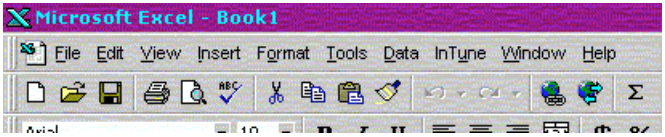
5. Click **OK**. The **InTune Spreadsheet Converter** will be included in the list of Add-Ins (see Figure 11-2).

Figure 11-2 Add In Window



6. Click **OK**. An **InTune** selection will appear on the menu bar (see Figure 11-3).

Figure 11-3 Excel Menu with InTune Add-In



Removing the InTune Add-In

1. Choose **Tools=> Add-Ins**.

2. Click the **InTune Spreadsheet Converter** box to clear the check box.

3. Click **OK**. The **InTune** menu selection is removed.

Note

The Add-In will remain in the directory where you installed it, and on the Add-in selection list. To re-install, see “Installing the InTune Add-In” on page 11-9.

Generating InTune Spreadsheet Reports

Using the InTune Spreadsheet Converter, you can upload InTune data into Microsoft Excel and generate a set of basic reports. Using the functions within Microsoft Excel, you can also modify these basic reports, or create new ones using the InTune data.

Exporting Monitor Data from InTune

You can export InTune data from the Monitor Definition Panel, the Monitor History panel, or the External Data Set List panel.

1. Issue the V (CSV Export) line command for the monitor profile you want to export.

   The CSV Reporting panel is displayed (see Figure 11-4 on page 11-12).The CSV options are identical to the Batch options (page 3).

2. Select the Data Set and Report options you want to export.

3. Issue the SUBmit command. The data will be exported to the specified data set.

4. Using a file transfer program, transfer the data set to your PC in **ASCII** format (text). It is recommended that you create a special folder to contain your InTune data.

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Figure 11-4 CSV Reporting Panel

```
InTune ------------------------- CSV Reporting ------------------------------
COMMAND ===>
                                                          Profile: TUNIVP1
                                                                 More:     +
  Output Data Set Options
       Data set name  ===> 'INTUNE.INTUNE1.TUNIVP1.CSV'
      Tracks Primary  ===> 15             Secondary         ===> 15

        Volume Serial  ===>          or    Storage Class     ===>
                Unit   ===> SYSALLDA       Data Class        ===>
                                           Management Class  ===>
  Reporting options
    Analysis option   ===> NORMAL         Monitor History   ===> Y
    TaskView          ===> Y              TranView          ===> Y
    DelayView         ===> Y              CodeView          ===> N
    DataView          ===> N              Linklist          ===> N
    ModView           ===> N              PoolView          ===> N

  Options for TaskView
    Code Detail       ===> N
    Task  1           ===> *              Task 2            ===>
    Task  3           ===>                Task 4            ===>

  Options for DelayView
    Delay details     ===> ON

  Options for CodeView
    All or top 5      ===> N              CodeView mode     ===> CSECT
    Histogram Csect 1 ===>                Histogram Csect 2 ===>
    Histogram Csect 3 ===>                Histogram Csect 4 ===>

  Options for DataView
    DB2 Code Detail   ===> N

  Options for TranView
    Code Detail       ===> N
    Transaction 1     ===> *              Transaction 2     ===>
    Transaction 3     ===>                Transaction 4     ===>

  Job Cards
    ===> //TUNCSV JOB (1234),'INTUNE BATCH REPORT',
    ===> //  CLASS=F,MSGCLASS=R,NOTIFY=&SYSUID
    ===> //*
    ===> //*

Scroll UP or DOWN for more options.  Enter SUBmit to submit a batch job,
press END to exit and save changes, or enter CANCEL to exit without saving.
```

Opening the InTune Monitor Data Set

Select the downloaded file.

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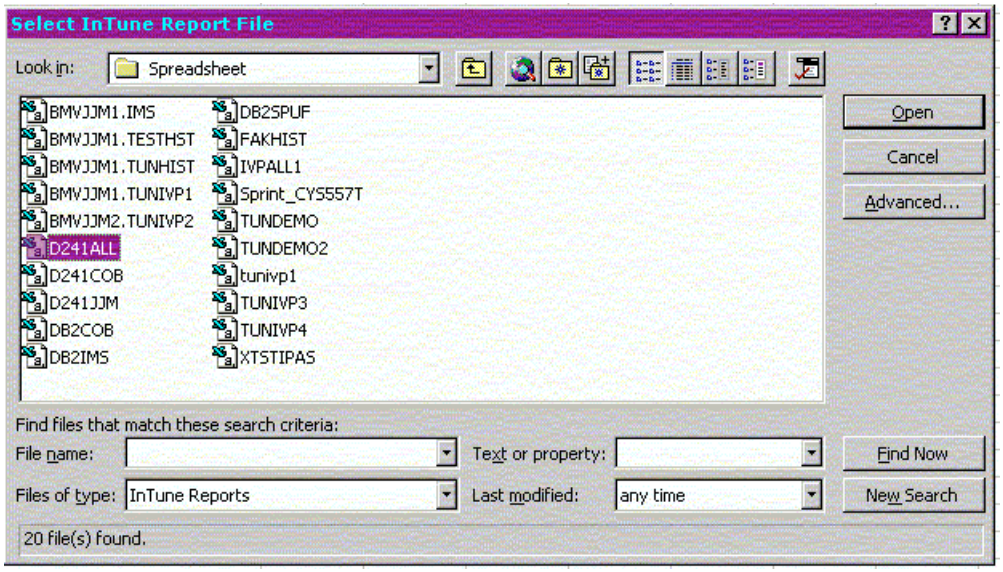
1. From the InTune menu, choose **Convert InTune Reports.** The Select InTune Report File pop-up window is displayed (see Figure 11-5)

Figure 11-5 Select InTune Report Window

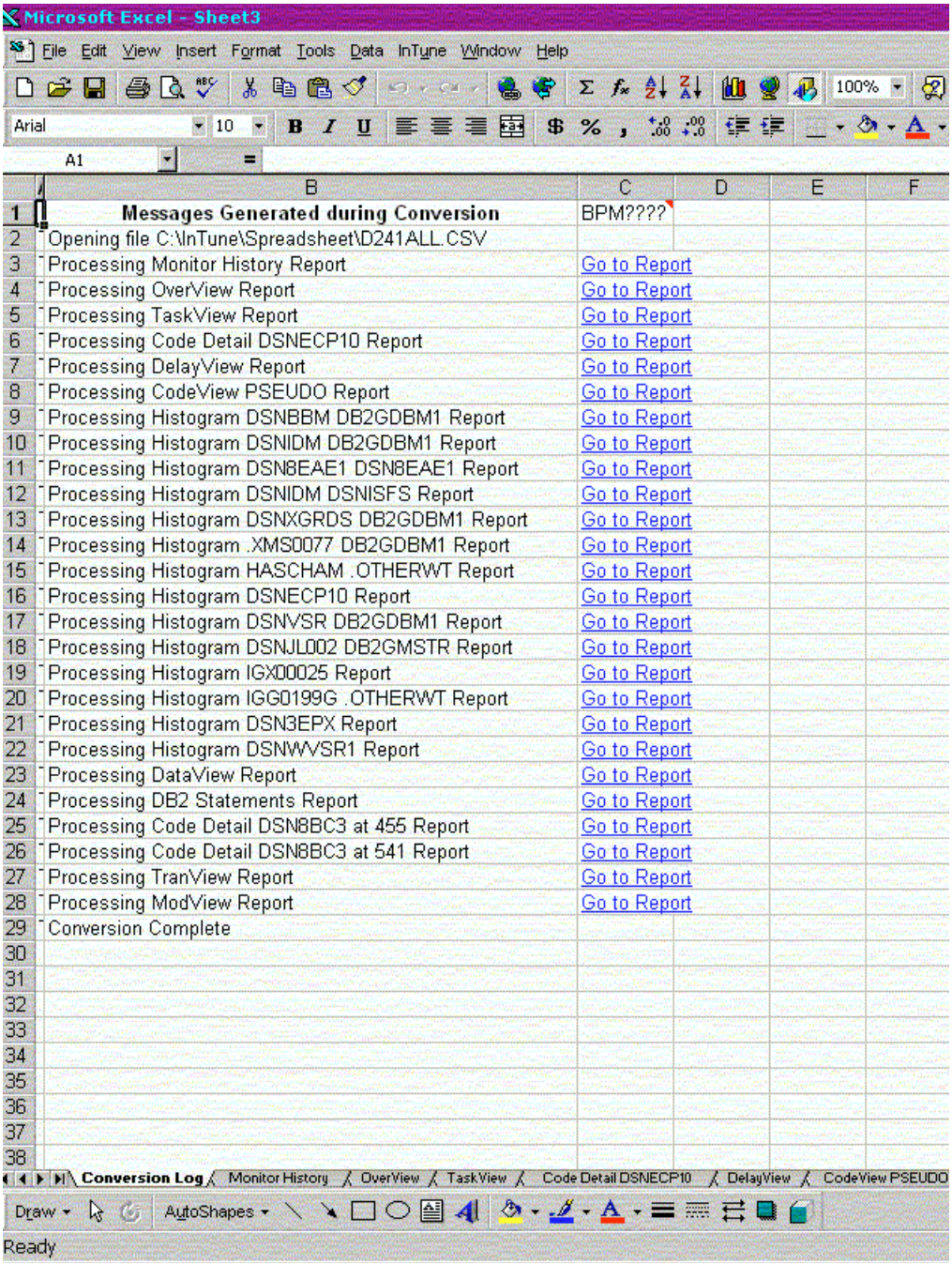


2. Navigate to the folder where you downloaded the monitor data set.

3. Open the file by double-clicking the file name, or selecting the file then clicking on the **Open** button.

The data will be loaded, and you will be presented with a Conversion Log. This lists the reports generated, and any errors encountered.

Figure 11-6 Conversion Report



	B	C	D	E	F
1	**Messages Generated during Conversion**	BPM????			
2	Opening file C:\InTune\Spreadsheet\D241ALL.CSV				
3	Processing Monitor History Report	Go to Report			
4	Processing OverView Report	Go to Report			
5	Processing TaskView Report	Go to Report			
6	Processing Code Detail DSNECP10 Report	Go to Report			
7	Processing DelayView Report	Go to Report			
8	Processing CodeView PSEUDO Report	Go to Report			
9	Processing Histogram DSNBBM DB2GDBM1 Report	Go to Report			
10	Processing Histogram DSNIDM DB2GDBM1 Report	Go to Report			
11	Processing Histogram DSN8EAE1 DSN8EAE1 Report	Go to Report			
12	Processing Histogram DSNIDM DSNISFS Report	Go to Report			
13	Processing Histogram DSNXGRDS DB2GDBM1 Report	Go to Report			
14	Processing Histogram .XMS0077 DB2GDBM1 Report	Go to Report			
15	Processing Histogram HASCHAM .OTHERWT Report	Go to Report			
16	Processing Histogram DSNECP10 Report	Go to Report			
17	Processing Histogram DSNVSR DB2GDBM1 Report	Go to Report			
18	Processing Histogram DSNJL002 DB2GMSTR Report	Go to Report			
19	Processing Histogram IGX00025 Report	Go to Report			
20	Processing Histogram IGG0199G .OTHERWT Report	Go to Report			
21	Processing Histogram DSN3EPX Report	Go to Report			
22	Processing Histogram DSNWVSR1 Report	Go to Report			
23	Processing DataView Report	Go to Report			
24	Processing DB2 Statements Report	Go to Report			
25	Processing Code Detail DSN8BC3 at 455 Report	Go to Report			
26	Processing Code Detail DSN8BC3 at 541 Report	Go to Report			
27	Processing TranView Report	Go to Report			
28	Processing ModView Report	Go to Report			
29	Conversion Complete				
30					
31					
32					
33					
34					
35					
36					
37					
38					

Viewing the Generated Reports

Each report is located on a separate worksheet. To view a report, click the appropriate worksheet tab (or click the hyper link on the Conversion Log).

Viewing Report Graphs

Some reports include pre-defined graphical reports. Click the appropriate button at the top of a report sheet to generate the graph.

Report Examples

Following are some examples of different reports that are available.

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Figure 11-7 Overview Report

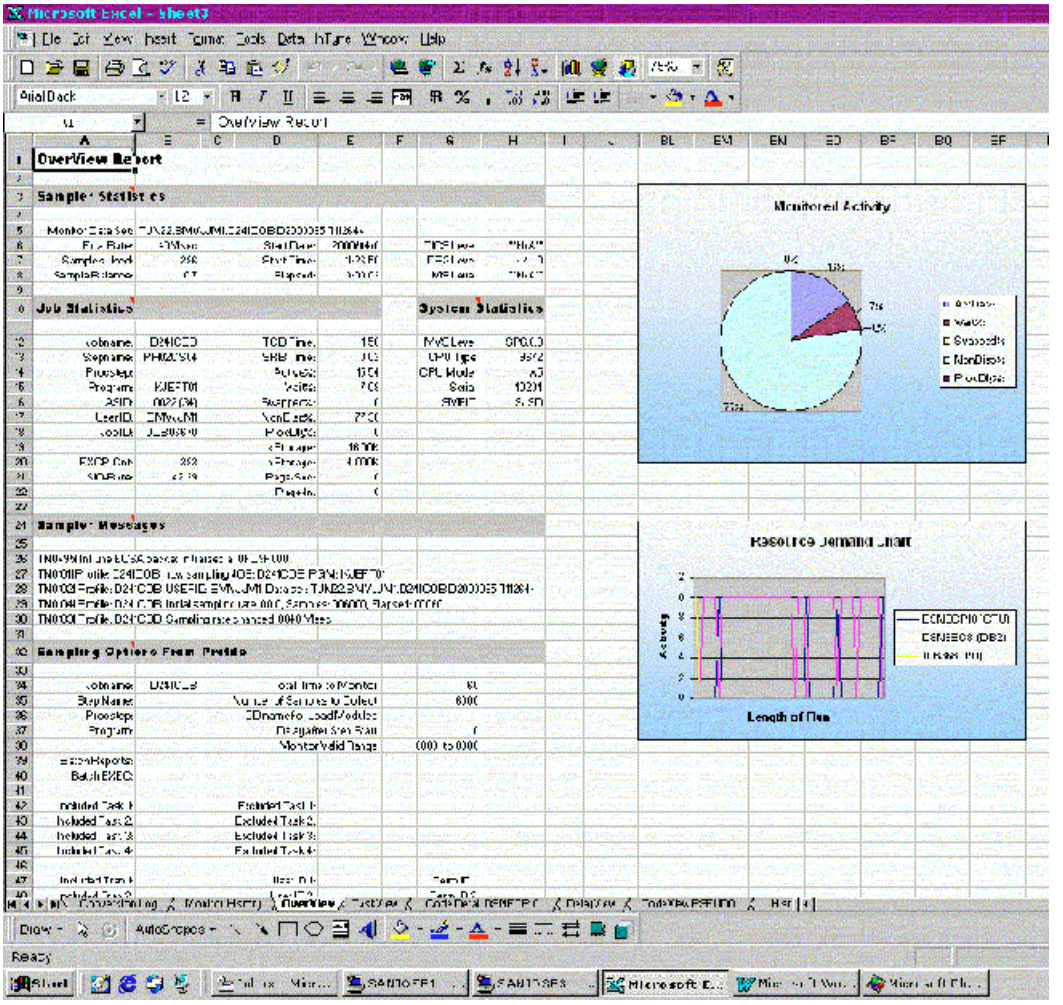


Figure 11-8 CodeView Report

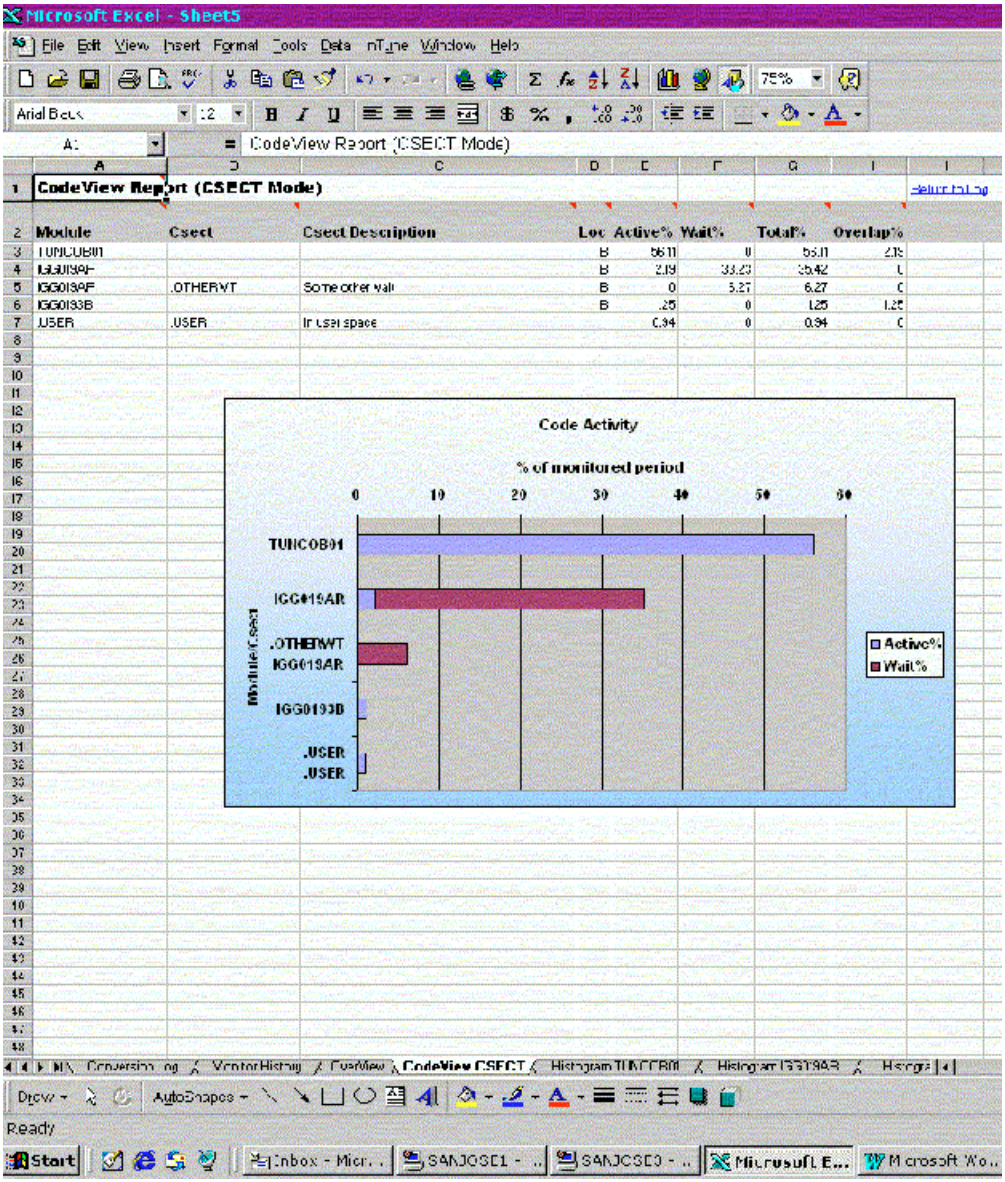
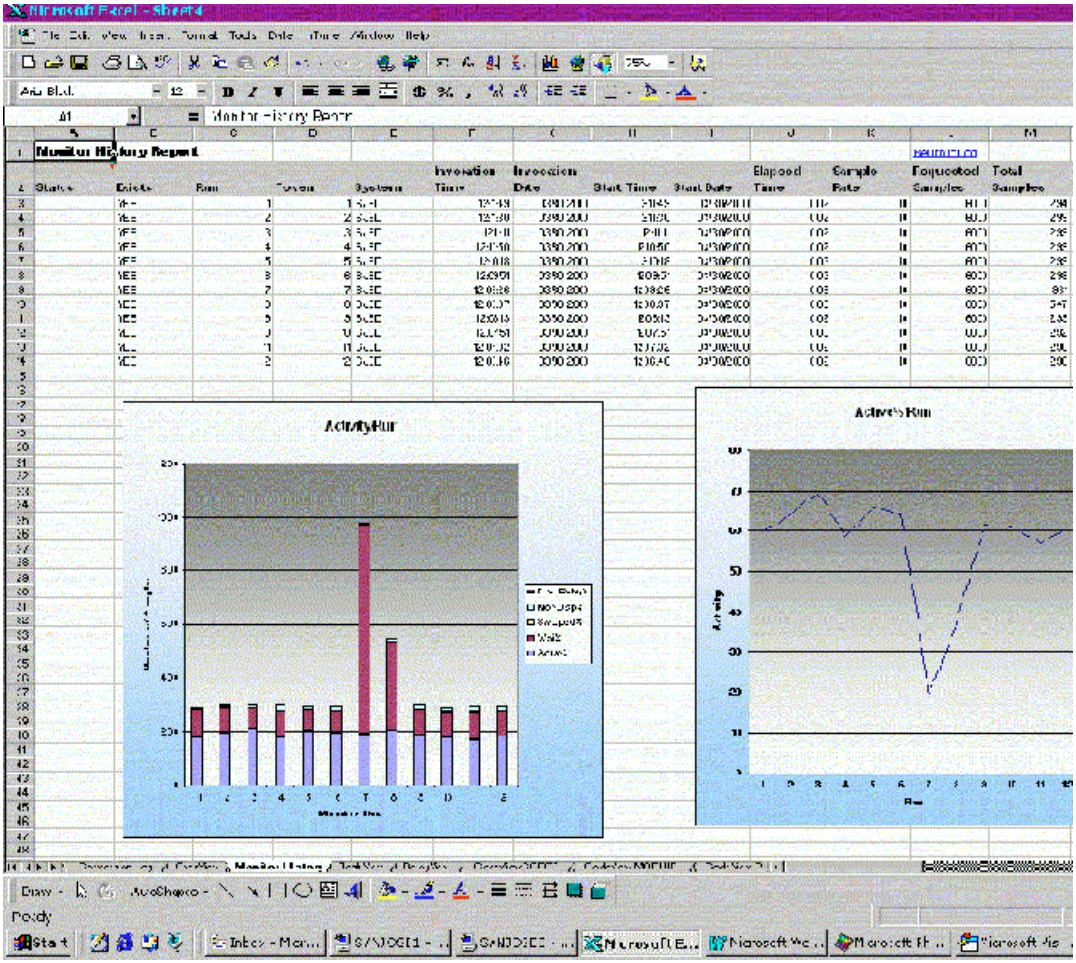


Figure 11-9 Monitor History Report



Modifying and Creating Reports

The reports generated by the InTune Spreadsheet Converter contain the exported data in tabular format, and graphic reports for basic information. If you require specific reports, you can create your own reports and graphs using the InTune data. Refer to your Microsoft Excel documentation for information on how to create reports using Microsoft Excel.

Maintenance and Support

Since the InTune Spreadsheet converter is distributed as a mainframe file, it will be maintained using standard SMP tools.

Maintenance

Updates to the spreadsheet converter will be distributed by way of the usual BMC Software Candidate and PUT mechanisms. Emergency fixes can be sent by standard BMC Software maintenance procedures. Whenever a spreadsheet converter PTF is sent, the HOLDDATA file will alert you there is an updated version that needs to be downloaded. Use the same procedures for downloading as described in “Installing the InTune Spreadsheet Converter for Microsoft Excel 97” on page 11-8.

Customer Support

For incidents for the spreadsheet converter, BMC Software Customer Support personnel will need a copy of the reports that were being converted. A copy of the resulting spreadsheet may also be required. Since the report and spreadsheet files reside on your PC, you should be able to send them as an attachment to an e-mail, or by putting them on a diskette and mailing the disk to BMC Software Customer Support.

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Using InTune to Tune Your Application

InTune measures delays incurred by an application program, both from outside sources and within the program's own code. InTune's panels provide information about a variety of delay types. The best place to start looking for delays is with DelayView. With DelayView, you can see which types of operations were executed and how much elapsed time was spent in each operation type.

This chapter discusses the following topics:

Overview of Delay Categories 12-2
Program Active Delays. 12-4
Voluntary Wait Delays 12-4
Abend Procedure Delays 12-5
Data Delays 12-5
Resource Conflict Delays. 12-7
System Active Delays. 12-8
File Management Delays 12-9
Program Load Delays. 12-10
DASD Management Delays 12-10
Other Delays. 12-11

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Overview of Delay Categories

InTune's autonavigation enables you to go directly from a delay category to a more detailed panel which provides relevant information about the delay. An overview of delay types is provided in Table 12-1, along with recommendations about how to use InTune to find out more about why your job was experiencing a delay.

Table 12-1 Overview of Delay Categories

Category	Explanation	For more information...
Program Active	The program or one of its subroutines is in control of a CPU. Place your cursor anywhere on the line and press Enter, or select Option 3 to see which modules have the highest CPU usage.	See Table 12-2, "Program Active," on page 12-4
Voluntary Wait	The program has voluntarily relinquished control of a CPU. Use the **A**ddress line command to determine the delay locations within your application.	See Table 12-3, "Voluntary Wait," on page 12-4
Abend Procedure Delay	A component of the application is terminating abnormally or gathering diagnostic information for a problem. Use the **A**ddress line command to determine where the program invoked the abend procedures.	See Table 12-4, "Abend Procedure," on page 12-5
Data Delay	The program is waiting for data to be returned. Place your cursor anywhere on the line and press Enter, or select Option 5 to see which files caused the greatest delay.	See Table 12-5, "Data Delay," on page 12-5
Resource Conflict	The program is delayed because another program has exclusive use of a required resource, such as a file or program. Use the **A**ddress line command to determine which modules spent time waiting for resources.	See Table 12-6, "Resource Conflict Delays," on page 12-7
System Active	The program is using operating system functions, such as storage administration or system security. Place your cursor anywhere on the line and press Enter, or select Option 3 to see which modules have the highest CPU usage.	See Table 12-7, "System Active," on page 12-8

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Table 12-1 Overview of Delay Categories

Category	Explanation	For more information...
File Management Delay	The program is delayed by a file management operation such as locating or opening a file. Use the **A**ddress line command to determine which modules spent time waiting for file management activities.	See Table 12-8, “File Management Delay,” on page 12-9
Program Load Delay	The program is delayed by the operating system while it performs program management functions. Program management includes locating a program on DASD, obtaining storage, reading the program, or converting the relative addressing information into absolute addresses. Use the **A**ddress line command to determine which modules spent time waiting for program load activity.	See Table 12-9, “Program Load Delay,” on page 12-10
DASD Management Delay	The program is delayed because of a DASD file management function that is not part of normal file management. Use the **A**ddress line command to determine which modules spent time waiting for DASD management functions.	See Table 12-10, “DASD Management Delay,” on page 12-10
CICS Delays	The CICS subsystem delays are divided into the following categories: • CICS System Delay • CICS TransData • CICS StorCtl Delay • CICS TaskCtl Delay • CICS FileCtl Delay • CICS JourCtl Delay • CICS TempStor Delay • CICS ProgCtl Delay • CICS TermCtl Delay • CICS DL/I Delay	See Chapter 14, “Using InTune in a CICS Environment”
Other Delays	The program is delayed for a reason not listed in this table. These delays may be related to paging, swapping, non-dispatching, or other reasons.	See Table 12-11, “Other Delay,” on page 12-11

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Program Active Delays

The following table describes the various types of program active delays, and the possible reasons for them.

Table 12-2 Program Active

Delay Type	Reason
Algorithms	An algorithm in the program or one of its subroutines is using CPU time.
High Level Language options	Specifying high overhead compiler options, such as DEBUG or TRACE.
Data definitions and conversion	High-level languages can use significant CPU time to convert numeric data intended for display to a format that can be used in computation, such as a subscript, that accesses table entries defined in the program or one of its subroutines.

Voluntary Wait Delays

The following table describes the various types of voluntary wait delays, and the possible reasons for them.

Table 12-3 Voluntary Wait

Delay Type	Reason
Wait for inter-task function	The program or one of its subroutines is waiting for another task or address space to present information or is waiting to receive a work request.
Calls to database system other than IMS, DB2, Adabas, or CA-Datacom	The program or one of its subroutines is requesting data from a database of which InTune has no internal knowledge. The delay is reported but not attributed to a specific database system.
Wait/Waitr SVC	Performance of the active task cannot continue until one or more specific events have occurred.

Abend Procedure Delays

The following table describes the various types of abend procedure delays, and the possible reasons for them.

Table 12-4 Abend Procedure

Delay Type	Reason
Too many SNAP dumps	The process of taking SNAP dumps is taking a significant amount of processing time. Reduce the number of SNAP dumps to decrease overall processing time.
Program using abend processing	A program or one of its subroutines is using OS/390 abend services to process invalid data. You should use another means other than OS/390 abend services to eliminate or reduce abend processing time.

Data Delays

The following table describes the various types of data delays, and the possible reasons for them.

Table 12-5 Data Delay

Delay Type	Reason
Placement of data sets	Queueing delays are occurring because data sets used by the program or one of its subroutines reside on busy DASD volumes.
Insufficient buffers for sequential access methods	Too few buffers are defined for a file to provide timely sequential data set access processing.
Block size too small for sequential access methods	The block size is too small and causes too many I/O operations. Delays are reported for both the processing time to start and to complete the I/O operation and for the wait for data to be returned.
File is fragmented into many extents	The file used by the program or one of its subroutines is in many extents. This causes additional seeking to take place on the device, which delays the program.
VSAM files poorly buffered	There is an insufficient number of index and data buffers defined for VSAM files, or the buffers are too small.

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Table 12-5 Data Delay

Delay Type	Reason
VSAM files use share options (4,4)	When VSAM data sets must be open in more than one address space for update, each application must use share options that preserve the integrity of the data. When these share options are used, each read requires an I/O operation to refresh the data because another address space may have updated the data.
Insufficient buffers for VSAM files that use local or global shared resources	If a program uses VSAM shared resources for multiple files to better utilize virtual memory, not having enough buffers of a required size causes delays waiting for buffers to become available. This is especially important for read operations because the intent is to find the data in the memory buffer as often as possible. Reduce data delays by tuning the buffers to the workload that uses the buffer pool.
DB2 SQL process time	An application may spend inordinate amounts of time waiting for data to be returned for an SQL statement. This can be caused by excessive page scans if an INDEX is not available to speed the data retrieval. For more information about SQL delays, see Chapter 13, “Using InTune in a DB2 Environment”.
IMS database process time	An application may spend inordinate amounts of time waiting for data from an IMS database to be returned. For more information about IMS delays, see Chapter 15, “Using InTune in an IMS Environment”.

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Resource Conflict Delays

The following table describes the various types of resource conflict delays, and the possible reasons for them.

Table 12-6 Resource Conflict Delays

Delay Type	Reason
Data set in use by another application	When jobs are executed concurrently, OS/390 provides data integrity using system-wide enqueues. If a job allocates a data set using DISP=SHR, it has concurrent access, but each program must ensure data integrity. If a job allocates a data set using DISP=OLD, OS/390 provides data integrity, requiring all other programs to wait until the data set is free. Reduce resource conflicts by ensuring that jobs use the same resources in a serial manner.
Logical resources in use by another application	OS/390 provides the ENQUEUE/DEQUEUE facility to ensure that logical resources are protected when multiple jobs or tasks require serialization. For example, when the program uses the ENQUEUE facility to provide a queueing function for a server task, the requesting tasks waiting in ENQUEUE are delayed. Reduce resource conflicts, caused when queueing is emulated with the ENQ/DEQ services, by using another queueing algorithm.

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System Active Delays

The following table describes the various types of system active delays, and the possible reasons for them.

Table 12-7 System Active

Delay Type	Reason
Repeated calling of DATE/TIME services	A program or one of its subroutines repeatedly calls the date/time operating system services. Reduce this type of delay by obtaining the date once and use it for the entire program execution.
Excessive storage management activity	A program or one of its subroutines is allocating and freeing areas of virtual memory excessively. Storage management is an expensive function that causes application delays if not properly utilized. You can reduce delays resulting from excessive storage management by designing the program to allocate and free storage less frequently.
Excessive use of timer services	A program or one of its subroutines uses the timers provided by OS/390 or an application enabler, such as CICS, to control a time-dependent feature of the application. Timer services should be used sparingly since their use can cause system delays.
Extensive security calls	A security system protects all physical and logical system resources, and calls to the protection routines are causing excessive CPU use. Excessive security implementation in an online environment can account for up to 10 percent of processor usage.

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File Management Delays

The following table describes the various types of file management delays, and the possible reasons for them.

Table 12-8 File Management Delay

Delay Type	Reason
Wait for tape mount	A program or one of its subroutines is waiting for a tape mount. Tape mount delays are experienced in the OPEN and End of Volume system services. End of volume processing is the function that requests subsequent volumes of a multi-volume data set, which usually resides on tape.
Excessive OPEN and CLOSE requests for a file	A program or one of its subroutines may OPEN a file, perform a single I/O operation, and then immediately CLOSE the file. OPEN/CLOSE are very expensive operating system functions that contribute heavily to overall delay.
Small data set extent allocation	Additional time is spent allocating additional data set extents as the data set expands. Reduce this type of delay by allocating a large enough data set to eliminate additional extents allocation.
High VSAM catalog activity	When a VSAM data set is OPENed or CLOSEd, a number of accesses are made to the CATALOG service routines to fetch control blocks or to write statistics. It is not possible to control the time spent in CATALOG services, but files may be OPENed too often or unnecessarily.

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Program Load Delays

The following table describes the various types of program load delays, and the possible reasons for them.

Table 12-9 Program Load Delay

Delay Type	Reason
Request to bring modules into memory	Delays occur when a module is brought repeatedly into memory or when the search for the module on DASD takes a long time. Factors that influence search times include concatenated libraries, large directories, or poor placement of the libraries.
Large concatenation used for program library	A program or one of its subroutines uses a large concatenation of data sets that reside on different volumes and require a significant amount of I/O to process the program management activity.

DASD Management Delays

The following table describes the various types of DASD management delays, and the possible reasons for them.

Table 12-10 DASD Management Delay

Delay Type	Reason
Insufficient space allocated initially for the data set	If the job JCL allocates too little space for a data set, OS/390 will allocate secondary extents as necessary to hold all the data. The data set allocated should be large enough to hold all of the data initially, preventing unnecessary allocations from taking place.

Other Delays

The following table describes the various other types of delays, and the possible reasons for them.

Table 12-11 Other Delay

Delay Type	Reason
Demand paging	One or more of the following may be present in the program or in one of the subroutines it calls: • A program is link-edited inefficiently. • Data arrays are used incorrectly. • Too many data buffers are specified.
VIO paging	VIO data sets are simulated files that can significantly reduce I/O delays. They are essentially paging files that are managed by OS/390. The only drawback is that, if the application requests a record that is not in the VIO window, a page fault will occur that will not be processed concurrently with the application program and the application will experience delay.
Swapping	This delay is caused when • The program or one of its subroutines is requesting system resources that are unavailable. • The installation's tuning parameters are improperly set.

Using InTune in a DB2 Environment

InTune is compatible with DB2 Releases 2.3, 3.1, 4.1, and 5.1. Once you've monitored your application, you can begin analysis.

Note

You must specify DB2 system information prior to monitoring. This can be done using AutoCustomization (see "Using AutoCustomization" on page 2-6), or manually (see "Task 8 - Create DB2 Definitions" on page 2-19).

This chapter describes the following topics:

Analyzing DB2 Data 13-2
Using the Explain Function 13-7

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Analyzing DB2 Data

Delays processing SQL statements are usually caused by improperly designed applications and databases, inadequate indexing, and programming errors. InTune can help identify application problems that occur when performing the following activities:

- Designing the application program
- Determining when an application should be rebound
- Determining the access path chosen for a query
- Designing the database

InTune enables you to analyze DB2 data to the SQL statement level. Use the following steps to see the SQL statements for a DB2 job:

1. Set up your monitoring criteria so that the Number of samples to collect field contains a number in the range of 3000 to 10000.
2. Invoke the monitor using the **I**nvoke line command.
3. Analyze the data using one of the analysis line commands (A, AL, AA, or AW).
4. Select Option 5 from the Interactive Analysis menu to display the DataView panel (Figure 13-1).

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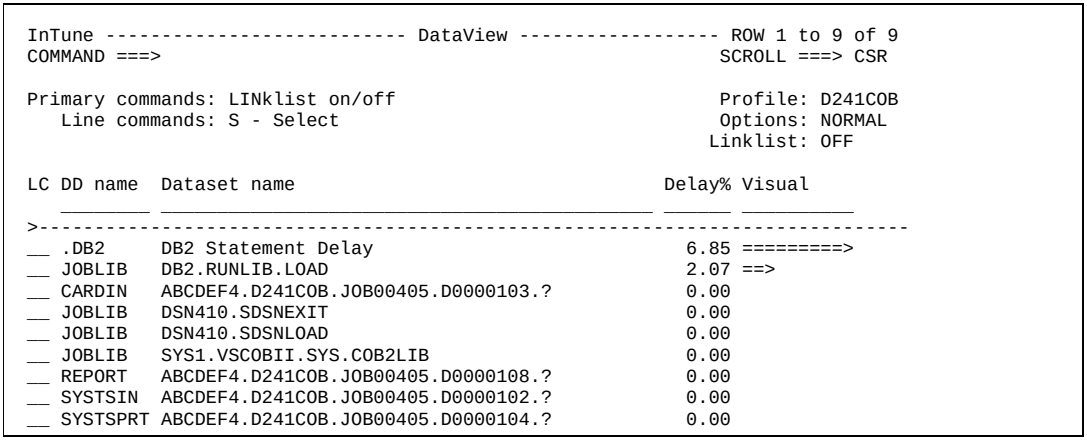
Figure 13-1 DataView for a DB2 Environment



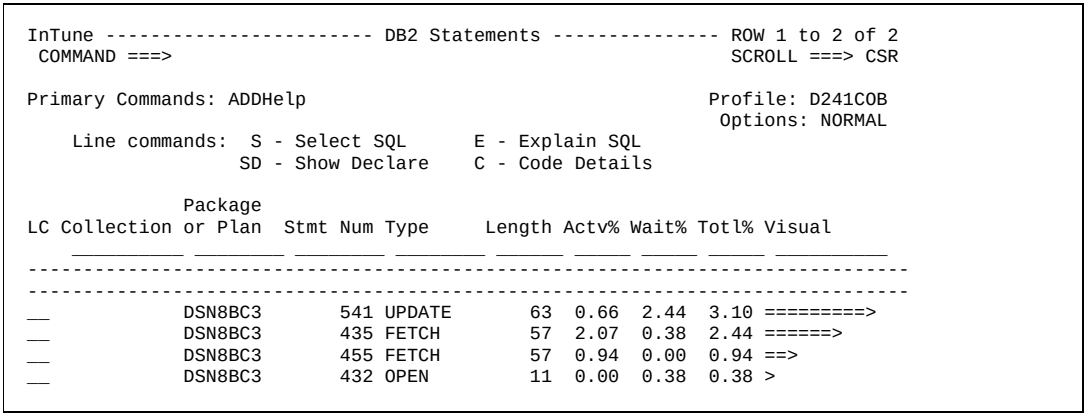
```
InTune --------------------------- DataView ------------------ ROW 1 to 9 of 9
COMMAND ===>                                                   SCROLL ===> CSR

Primary commands: LINklist on/off                              Profile: D241COB
   Line commands: S - Select                                   Options: NORMAL
                                                              Linklist: OFF

LC DD name  Dataset name                                    Delay% Visual
   ________ ____________________________________________ ______ ___________
>-------------------------------------------------------------------------------
__ .DB2     DB2 Statement Delay                               6.85 =========>
__ JOBLIB   DB2.RUNLIB.LOAD                                  2.07 ==>
__ CARDIN   ABCDEF4.D241COB.JOB00405.D0000103.?              0.00
__ JOBLIB   DSN410.SDSNEXIT                                  0.00
__ JOBLIB   DSN410.SDSNLOAD                                  0.00
__ JOBLIB   SYS1.VSCOBII.SYS.COB2LIB                         0.00
__ REPORT   ABCDEF4.D241COB.JOB00405.D0000108.?              0.00
__ SYSTSIN  ABCDEF4.D241COB.JOB00405.D0000102.?              0.00
__ SYSTSPRT ABCDEF4.D241COB.JOB00405.D0000104.?              0.00
```

5. Type S next to .DB2 in the DD name field.

6. Press **Enter**.

   The DB2 Statements panel (Figure 13-2) is displayed:

Figure 13-2 DB2 Statements Panel



```
InTune ------------------------ DB2 Statements --------------- ROW 1 to 2 of 2
 COMMAND ===>                                                   SCROLL ===> CSR

Primary Commands: ADDHelp                                     Profile: D241COB
                                                               Options: NORMAL
    Line commands:  S - Select SQL      E - Explain SQL
                   SD - Show Declare    C - Code Details

              Package
LC Collection or Plan  Stmt Num Type     Length Actv% Wait% Totl% Visual
   __________ ________ ________ _______ ______ _____ _____ _____ __________
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
__            DSN8BC3       541 UPDATE       63  0.66  2.44  3.10 =========>
__            DSN8BC3       435 FETCH        57  2.07  0.38  2.44 ======>
__            DSN8BC3       455 FETCH        57  0.94  0.00  0.94 ==>
__            DSN8BC3       432 OPEN         11  0.00  0.38  0.38 >
```

The fields displayed on this panel are described in Table 13-1

Table 13-1 DB2 Statements Fields

Statement	Description
Collection	Name of the group of packages that have the same qualifier.
Package or Plan	Name of an object containing a set of SQL statements that have been bound statically and that are available for processing.
Stmt Num	Number of the unique SQL statement that is contained in a Package or Plan.
Type	Type of operation that is being performed with the statement.
Length	Length of the SQL statement.
Actv%	Percentage of the monitored period that InTune detected CPU utilization attributed to the processing of the SQL statement.
Wait%	Percentage of the monitored period that InTune detected a wait state attributed to the processing of the SQL statement.
Totl%	Sum of the Actv% and Wait% fields.
Visual	Visual representation of the Totl% field for the SQL statement.

The line commands available on this panel are described in Table 13-2.

Table 13-2 DB2 Statements Line Commands

Command	Description
Select	Displays the SQL Statements panel (Figure 13-4 on page 13-6), which shows the full text of the selected SQL statement.
Show Declare	Displays the DCL Statement panel (Figure 13-2 on page 13-3), which shows the DECLARE statement coded by the application programmer for this DB2 verb. This line command is valid for the OPEN, CLOSE, INSERT, DELETE, and FETCH verbs. You must have the RXD2 product installed.

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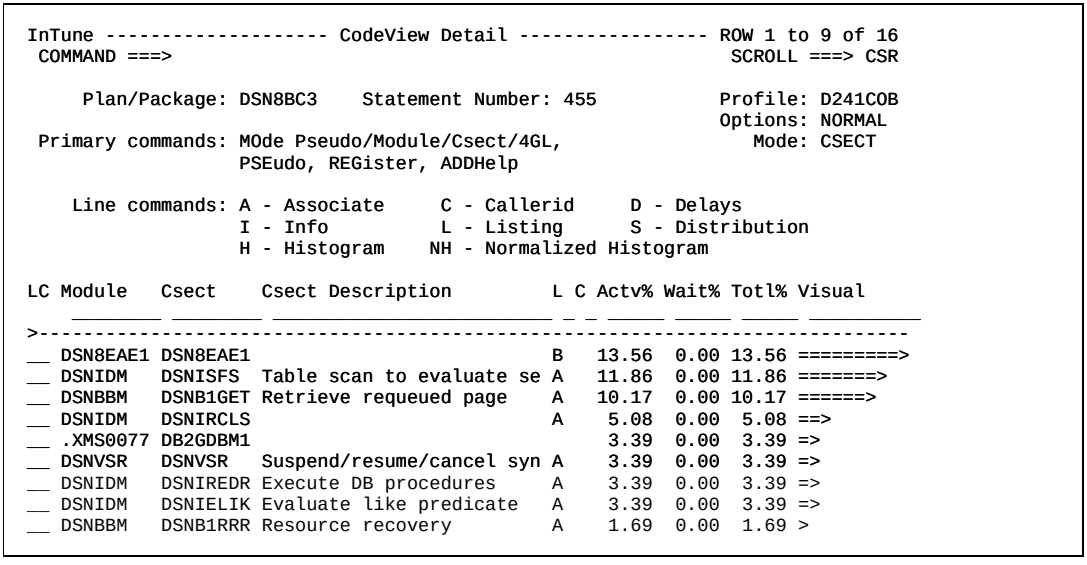
Table 13-2 DB2 Statements Line Commands

Command	Description
Explain	Interfaces to the RXD2 Explain panel (Figure 13-2 on page 13-3) for the SQL statement. You must have the RXD2 product installed.
C	Code Details line command which displays the CodeView Detail panel. The CodeView Detail panel reports the activity of each Module and Csect associated with the selected DB2 plan/package name and statement number (as active and wait percentages of all samples in the monitor data set). From the Code Detail panel, you can create a Histogram showing the locations within a Csect where delays occurred, or you can list the types of delay found within a Csect. See page 31 for a complete description of CodeView. An example of the CodeView Detail panel is shown on page 5.

Figure 13-3 CodeView Details Panel for DB2



The DB2 Statements panel is sorted by the Totl% field. Statements with the highest overall delay appear at the top. Once you identify the statement that caused an excessive delay, use the Explain function to perform further analysis of the way DB2 is processing the SQL statement. For information, see “Using the Explain Function” on page 13-7.

7. To select a DB2 statement, type S next to it. In this example, the first statement, number 541, is selected.

   The SQL Statements panel (Figure 13-4) is displayed.

Figure 13-4 SQL Statements Panel

```
InTune ------------------------ SQL Statements --------------- ROW 1 to 1 of 1
COMMAND ===>                                                  SCROLL ===> CSR

        DBRM name: DSN8BC3                                    Profile: D241COB
        Statement: 541
        Stmt type: UPDATE
        Timestamp: 99.732 17:09:08

    Line commands: E - Explain

LC SQL Text
   ____________________________________________________________________________
------------------------------------------------------------------------------
__ UPDATE VEMPLP SET PHONENUMBER = : H WHERE EMPLOYEENUMBER = : H
******************************** End of Table ********************************
```

This panel displays the SQL text for the statement. Extra spaces have been removed from the statement text. InTune obtains this SQL statement from DB2 space block (SPA).

Note

There are occasions when DB2 has not loaded the current space block. In this event, the previously executed SQL statement is displayed instead of the current one. For more information, see the section titled “Analyzing SVC Dumps -- Finding the SQL Statement” in the DB2 manual *Diagnosis Guide and Reference*.

Using the Explain Function

You can get additional key information about the SQL statement using the **E**xplain line command on either the DB2 statements or SQL Statements panels.

Explain's primary purpose is to observe the access paths for reading the data. You can obtain limited information on UPDATE and DELETE.

Before you can use Explain, you must create a table called a PLAN_TABLE to hold the results of the Explain. Choose the 34-column format to receive maximum information. It is a good idea to always specify EXPLAIN(YES) when you bind a package or plan.

Explaining a SQL Statement

Type the **E**xplain line command in the LC field on the DB2 Statements panel and press **Enter**.

The Explain panel (Figure 13-5) is displayed.

Figure 13-5 RxD2 EXPLAIN Panel

```
---------------------------------- EXPLAIN -----------------------------------
Command ===>                                          TARGET ===> DB2G

Location         ===> DB2G
Catalog Prefix   ===> SYSIBM
Current SQLID    ===> DSN8410  (Plan_Table must exist for this SQLID)
Table Qualifier  ===>          (Used for unqualified tablenames)

Enter the query number to use ===> 1

SQL statement to be explained:
------------------------------------------------------------------------------
SELECT DISTINCT DEPTNO , DEPTNAME , MGRNO , SUBSTR ( FIRSTNME , 1 , 1 ) , MIDIN
T , LASTNAME FROM VDEPMG1 WHERE DEPTNO LIKE ? AND DEPTNAME LIKE ? AND '%' = ? A
```

Using EXPLAIN information

You can find out additional information about EXPLAIN and how its output can help you make performance evaluations of a particular SQL statement in the IBM manual, *DB2 Application Programming and SQL Guide*. Table 13-3 provides a partial list of the key issues you should attempt to resolve for long-running or often-used SQL.

Table 13-3 DB2 SQL Problems

Problem Description	Solution
Index matching did not work	An index was available for the table accessed, but there were no matching columns. This is often a result of a difference in the length of the data item in the program and the length of the column in the DB2 table.
Not using Sequential Prefetch	Sequential Prefetch reads multiple pages of a table into the buffer pool with a single I/O operation. This significantly reduces delays for SQL access when large amounts of data are accessed.
Not using List Prefetch	List Prefetch is a way of accessing data pages efficiently. List Prefetch can be used in conjunction with either single or multiple index access.
Not specifying parallel operations	Parallel operations specify that pages of a partitioned table may be prefetched using multiple I/O streams and, in DB2 4.1, multiple tasks. This improves access significantly.

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Displaying a DECLARE Statement

Type SD in the LC field on the DB2 Statements panel and press **Enter**.

The DCL Statement panel (Figure 13-6) is displayed.

Note

The SD line command is valid for the OPEN, CLOSE, INSERT, DELETE, and FETCH verbs. You must have the RXD2 product installed.

Figure 13-6 DCL Statement Panel

```
InTune ------------------------ DCL Statement --------------- ROW 1 to 2 of 2
COMMAND ===>                                                  SCROLL ===> CSR

        DBRM name: DSN8BC3                                    Profile: D241COB
        Statement: 277
        Stmt type: UPDATE
        Timestamp: 99.732 17:09:08


SQL Text
_____________________________________________________________________________
-------------------------------------------------------------------------------
DECLARE VEMPLP TABLE ( EMPLOYEENUMBER CHAR ( 06 ) NOT NULL , PHONENUMBER
CHAR ( 04 ) )
******************************** End of Table ********************************
```

This panel shows the DECLARE statement coded by the application programmer for this DB2 verb.

Using InTune in a CICS Environment

This chapter describes the types of delays that are specific to CICS. Use this chapter along with the tables in Chapter 12, “Using InTune to Tune Your Application” to analyze the types of delays that are specific to a CICS environment. InTune is compatible with CICS versions 3.2, 3.3, 4.1, and 5.1.

InTune recognizes the delays incurred by transactions and CICS tasks in this environment. The terms transactions and tasks define units of work within CICS. A transaction may comprise a single task or several tasks.

CICS is a transaction processing system that shares the resources of the region among many concurrently executing tasks. CICS management routines control the transaction’s access to all external and internal resources, such as files, databases, storage, programs, and special CICS facilities.

This chapter describes the following topics:

CICS Transaction Response Times 14-2
CICS Transaction Classes 14-2
Analyzing CICS Data 14-3

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CICS Transaction Response Times

CICS transaction response times are affected by four major factors:

- **System response time -** Depends on the implementation of the code and the speed of the processor.
- **DASD response time** - Generally responsible for most of the internal processing of a transaction.
- **Network response time -** May be in seconds or the internal time may be a fraction of a second. If the network is overloaded, you will never get good response time.

Note

InTune helps you monitor the internal processing time of a transaction and cannot identify problems with your network.

- **Existing workload** - Might affect the performance because of contention for hardware resources or logical resources.

CICS Transaction Classes

CICS has three classes of transactions:

- **Non-conversational -** A single transaction/task pair that has one input from a terminal user and returns a single output.
- **Conversational** - A single transaction and corresponding task that may interact with the terminal user by using several input and output operations.

  This type of work has the potential of wasting CICS resources because the task virtually does not end and holds certain CICS resources until the task ends.

- **Pseudo conversational** - A single transaction that might span several tasks. This type of work benefits a system when your response time is relatively slow because CICS resources are returned to the system during think times.

Analyzing CICS Data

To analyze CICS data to the SQL statement level, use the following steps to display the SQL statements for a CICS job:

1. Set up your monitoring criteria so that the Number of samples to collect field contains a number in the range of 3000 to 10000. See Chapter 5, “Setting Up a Monitor Definition” for more information about specifying monitoring criteria.

2. Invoke the monitor using the **I**nvoke line command.

3. Analyze the data using one of the analysis line commands (A, AL, AA, or AW).

4. Select Option 6 from the Interactive Analysis menu.

   The TranView panel (Figure 14-1) is displayed.

Figure 14-1 TranView Panel for CICS

```
InTune --------------------------- TranView ------------------ Row 1 to 4 of 4
COMMAND ===>                                                   SCROLL ===> PAGE

Primary commands: SELect, RECall, ADDHelp                    Profile: CIC4
                                                             Options: NORMAL
   Line commands: T - Tag     C - Code Details
                  U - Untag   D - Delay Details

LC TRAN     T #Trans Tot CPU Avg CPU Actv% Data% Other% Total% Visual
   ________ _ ______ ________ ________ _____ _____ ______ ______ __________
-------------------------------------------------------------------------------
__ AC01          242  1.5795  0.0065 80.85  0.00   0.00  80.85 =========>
__ **N/A**         0  0.0000  0.0000  2.13  0.00   2.13   4.26 >
__ CESN           69  0.0341  0.0005  4.26  0.00   0.00   4.26
__ CSTP           87  0.0292  0.0003  4.26  0.00   0.00   4.26
******************************** END OF TABLE *******************************
```

Using TranView for CICS

TranView displays activity in terms of the individual transactions detected. It divides the activity of these transactions into six major groups and displays the percentage of time each transaction spends in one of these groups. Table 14-1 provides a description for each field in TranView.

Table 14-1 TranView Fields

Field	Description
Tran	Name of a transaction detected by InTune during the monitoring of an IMS or CICS region.
T	“X” indicates the transaction has been tagged for analysis.
#Trans	Number of times the transaction completed during the monitored period.
Tot CPU	The cumulative CPU seconds for this transaction during the monitored period.
AVG CPU	Average CPU time required for this transaction during the monitored period.
Actv%	Percentage of time during the monitored period that the CPU was actively processing the monitored transaction.
Data%	Percentage of time during the monitored period that the transaction was delayed because of an I/O request.
Other%	Percentage of time during the monitored period that was not attributable to any of the categories known to InTune.
Totl%	Summation of the categories of delay.
Visual	Graphical representation of the total delay associated with the transaction.

InTune gives you flexibility when monitoring a job; you can specify user IDs, terminal IDs, and transaction codes, or use generic transaction codes on the CICS Monitoring Criteria window to focus the monitoring on specific units of work. The data displayed in TranView represents the selected transaction only. Refer to “Additional Monitoring Criteria” on page 5-16 to see how to specify transaction code information.

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Selecting Transactions for Analysis

TranView helps you identify the transactions on which you want to focus. If you select a transaction from TranView, InTune recalculates the values to reflect only the selected transactions. When you display DelayView, CodeView, and TimeView, you can see the recalculated values.

1. Type T next to the transactions you want to select for analysis. You may select up to five transactions.

2. Press **Enter**.

   An X will be displayed in the T column indicating which transactions are selected.

3. To deselect a transaction, type U next to it and press **Enter**.

4. Type the SELect primary command and press **Enter**.

   The TranView panel will only show the selected transactions, with all percentages calculated for the selected transactions only.

5. To redisplay all transactions, type RECall and press **Enter**.

Note

The transaction **N/A** is calculated from samples representing activity not associated with any particular transaction.

Using PoolView

CICS file accesses are usually the cause of most of the internal processing delays. CICS transactions may access any type of file but usually retrieve their data from VSAM files or a database management system such as IMS/DB or DB2.

The VSAM response time is especially sensitive to several key definitions, including

- Number of index buffers
- Number of data buffers
- Number of strings
- CI size
- CI and CA splits

InTune provides statistics on these critical parameters that can help improve the performance of a transaction.

You can access CICS VSAM files using a facility called Local Shared Resources (LSR). This feature creates a buffer pool in the monitored program's region that may be shared by a number of VSAM files. The number of buffers and strings you define for the pools can critically affect a transaction's performance. InTune allows you to look into your LSR pool with PoolView, which lists each group of buffers and their usage statistics.

1. From the Interactive Analysis menu, select Option 8.

   The PoolView panel (Figure 14-2) is displayed:

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Figure 14-2 PoolView

```
InTune -------------------------- PoolView ------------------ ROW 1 to 1 of 1
COMMAND ===>                                                  SCROLL ===> CSR

Line commands: S - Select                                   Profile: CICSMIX
                                                            Options: NORMAL
LC Type Group Category
   ____ _____ ____________________________________
--------------------------------------------------------------------------------
__ VSAM LSR   VSAM Local Shared Resource pool
```

Table 15-3, “PoolView Fields,” on page 15-8 describes the fields on the PoolView panel.

2. Type S.

3. Press **Enter**.

   The Shared Pools panel (Figure 14-3) is displayed.

Figure 14-3 Shared Pools

```
InTune ------------------------ Shared Pools ---------------- ROW 1 to 4 of 4
COMMAND ===>                                                  SCROLL ===> CSR

                    Pool type: LOCAL                        Profile: CICSMIX
               Total pool size: 81408                       Options: NORMAL
    Hit ratio for all subpools: 67.0%

Line commands: S - Select, D - Datasets

                  Pool  No. of  Buffer Buffer No. Requests  Requests  Hit
LC Type Group SP  Type  Buffers size   fixed  Str w/read    wo/read   Ratio
   ____ _____ ___ _____ _______ ______ _____ _________ _________ _____
>--------------------------------------------------------------------------------
__ VSAM LSR     1 BOTH        3    512 NO       1       843     1,717 67.0%
__ VSAM LSR     1 BOTH        3  2,048 NO       1         0         0 *N/A*
__ VSAM LSR     1 BOTH        3  4,096 NO       1         0         0 *N/A*
__ VSAM LSR     1 BOTH        3 20,480 NO       1         0         0 *N/A*
```

Table 15-4, “Shared Pools Fields,” on page 15-9 describes the fields on the Shared Pools panel.

High hit ratios indicate that a significant portion of the read requests are satisfied from buffers rather than from DASD. You can relate VSAM files to a buffer pool using the data and index CI sizes from the DataView detail panels. If a file indicates large delays, you can alter the number of buffers allocated for the CI size that the file uses.

4. To look at more detailed information about a VSAM pool, type S and press **Enter**.

   The VSAM Pool Details panel (Figure 14-4) is displayed. VSAM Pool Details displays the same information as shown in Shared Pools, but in a detail format.

Figure 14-4 VSAM Pool Details Panel

```
InTune --------------------------- VSAM Pool Details -------------------------
COMMAND ===>

                       Pool type: VSAM                      Profile: CICSMIX
                      Pool group: LSR
                         Pool ID: 1
                Number of buffers: 3
                      Buffer size: 512
                Number of strings: 1
            Placeholders in chain: 0
                        Hit Ratio: 67.0%
       Requests requiring a read: 843
    Requests satisfied from pool: 1717
           User initiated writes: 0
       Non-user initiated writes: 0
                 Retrieves by RBA: 0
                     ESDS inserts: 0
                 Retrieves by key: 0
                     KSDS inserts: 0
                    Buffer alters: 0
                        VSAM GETS: 0
                  Buffer searches: 0
            Error buffers in pool: 0
            Maximum error buffers: 0
```

5. To view a list of VSAM data sets opened using the specified pool, type D and press **Enter**.

   The Pooled Data Sets panel (Figure 14-5) is displayed. Each of the data sets uses the buffers provided by this pool for its I/O.

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Figure 14-5 Pooled Data Sets Panel

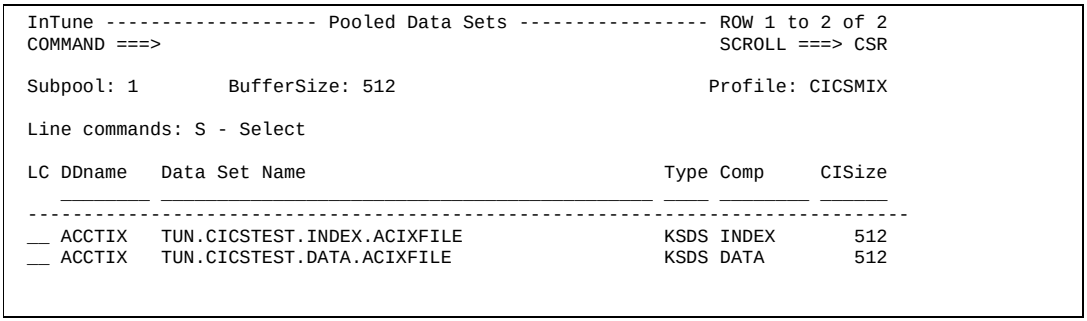

Table 14-2 describes the fields on the Pooled Data Sets panel.

Table 14-2 TranView Fields

Field	Description
Subpool	The identification number of the VSAM subpool.
Buffer size	The size in bytes of each buffer in the subpool.
DDname	The DDNAME used to allocate the data set.
Data Set Name	The full name of the data set.
Type	May be one of the following VSAM data set types: KSDS A key sequenced data set that always accompanied by an INDEX component. The index component does not have to use the same subpool. ESDS An entry sequenced data set.
Comp	The VSAM component may be one of the following: **DATA** - Contains real customer data. **INDEX** - Contains indexing information.
CISize	The Control Interval Size. The unit of transfer for VSAM data to and from storage. It is always a multiple of 512 bytes.

6. Type S next to one of the DD statements and press **Enter** to display an enhanced version of the Dataset Details panel.

Using DelayView

The best place to start looking for delays is with Option 2 on the Interactive Analysis menu. With DelayView, you can see which types of operations were executed and how much elapsed time was spent in each operation type.

Refer to “Interactive Analysis Option 2 - DelayView” on page 7-20 for more information.

Overview of CICS Delay Types

This section describes the types of delays that are specific to CICS.

InTune’s autonavigation enables you to go directly from a delay category to a more detailed screen that provides relevant information about the delay. See “Using Autonavigation” on page 4-14.

An overview of the delay types you see in a CICS environment is provided in Table 14-4, “CICS System Active,” on page 14-12, along with recommendations about how to use InTune to find out more about why your transactions are experiencing delays.

InTune groups delays into major and minor categories. An overview of CICS delay types is provided in Table 14-3.

Table 14-3 Overview of CICS Delay Categories

Category	Explanation	For more information...
CICS System Delays	Either CICS locks were held by the application causing delays or a function was shipped to another CICS region running in an MRO configuration.	See Table 14-4, “CICS System Active,” on page 14-12
CICS Transient Data	Transient data delays include all functions that read, write, or delete records to the transient data in VSAM data sets. Delays associated with actually performing I/O to the VSAM cluster also are included in this category.	See Table 14-5, “CICS Transient Data,” on page 14-12

Table 14-3 Overview of CICS Delay Categories

Category	Explanation	For more information...
CICS Storage Control	The storage allocated for the application includes CICS system-acquired storage for the application, such as areas for the program, data records, terminal areas, and messages. It also includes dynamically acquired user storage needed by the application.	See Table 14-6, “CICS Storage Control,” on page 14-13
CICS File Control	This category includes the delays associated with performing I/O to CICS files. The I/O is directly requested by the application or is performed on behalf of the application by CICS.	See Table 14-7, “CICS File Control,” on page 14-13
CICS Journal Control	Journal control delays are those delays associated with performing any actions to the CICS journals. Journaling is performed on behalf of the applications.	See Table 14-8, “CICS Journal Control,” on page 14-14
CICS Temporary Storage	Temporary storage delays are those delays that are incurred because of read/write activity to the Temporary Storage facility of CICS.	See Table 14-9, “CICS Temporary Storage,” on page 14-15
CICS Program Control	This category includes delays incurred by the application when programs are loaded by CICS.	See Table 14-10, “CICS Program Control,” on page 14-16
CICS Terminal Control	This category includes all delays incurred when reading or writing data to a terminal, all VTAM related delays, and delays caused when an application is waiting for input from the terminal user.	See Table 14-11, “CICS Terminal Control,” on page 14-16
CICS DL/I Resources	This category includes delays related to application requests to local DL/I resources and to DBCTL regions.	See Table 14-12, “CICS DL/I Resources,” on page 14-17

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The following table describes the various types of CICS system delays, and the possible reasons for them.

Table 14-4 CICS System Active

Delay Type	Reason
Lock delays	CICS obtains locks on behalf of the application for a variety of reasons. These locks normally exist for a short period of time. A significant delay may indicate a system definition problem.
MRO Inter-region delays	If your application uses the Multi Region Option of CICS, you may be delayed because you are unable to establish a session with the remote system. This indicates that too few sessions are available on the remote system, or, if the connection has been made, the other system is responding slowly and your request is delayed. InTune attempts to identify the name of the other CICS in its detail data.

The following table describes the various types of CICS transient data delays, and the possible reasons for them.

Table 14-5 CICS Transient Data

Delay Type	Reason
Extrapartition Queue locked	An application may wait when making a request to an extrapartition transient data queue because some other task is using that destination.
TD Queue locked	Transient data queues defined in the DCT as logically recoverable can cause delays because a subsequent task that is making a request to the same queue is forced to wait until the first application terminates or issues a synchpoint command.
Buffer wait	Occurs when all of the buffers for the transient data are in use. The application waits until a buffer becomes available.
VSAM string wait	Occurs when all of the VSAM strings for the transient data queue are in use. The application waits until a VSAM string becomes available.
VSAM I/O wait	Occurs when the transient data request is waiting for the VSAM I/O to the Transient Data VSAM file to complete.
VSAM I/O buffer wait	A brief delay that occurs when there is contention for a VSAM control interval.

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The following table describes the various types of CICS storage control delays, and the possible reasons for them.

Table 14-6 CICS Storage Control

Delay Type	Reason
CICS DSA USER DSA CICS EDSA USER EDSA CUSHION	Any of these delays can occur when a CICS region is stressed on storage. The two most important reasons for extended storage waits occur when the program or one of its subroutines issues an unconditional GETMAIN for storage and the request is for either • A very large amount of storage. • A reasonable amount of storage, but the system does not have the storage available because storage is fragmented or the CICS has reached a short-on-storage condition.

The following table describes the various types of CICS file control delays, and the possible reasons for them.

Table 14-7 CICS File Control

Delay Type	Reason
VSAM buffer	The application is waiting for a VSAM buffer that is controlled with CICS file control table definition parameters. Resolve this type of delay by increasing the number of buffers defined in the file control table.
VSAM Upgrade set	The application is attempting to read a record using a VSAM path while another application is updating the record.
File control state change	The application is attempting to change the state of a file resource, but another task is still using the file.
VSAM I/O	The application is waiting for VSAM I/O to complete. Another job or task in the system may be updating the same file and preventing the CICS I/O from completing.
VSAM String wait	The application is waiting for a VSAM string that the program or one of its subroutines is allocating to request data from a VSAM file.
VSAM file recovery failed	File recovery failed to complete. Since file recovery is handled by IBM routines, resolve file recovery wait problems with your systems programmer.

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Table 14-7 CICS File Control

Delay Type	Reason
Shared resource	The application has requested a MASSINSERT operation and is waiting for a VSAM transaction ID to become available.
VSAM exclusive control	The application has attempted to update a VSAM file and requires exclusive control of a VSAM control interval to complete the update. This type of delay indicates a high level of concurrency of transactions that require access to the same records in the CICS system.

The following table describes the various types of CICS journal control delays, and the possible reasons for them.

Table 14-8 CICS Journal Control

Delay Type	Reason
Subtask	The application is waiting for journal control to submit the archiving jobs to archive the journals.
Available ECB	The application is waiting for a logical ECB. There is only a specified number of ECBs available to journal control, and the wait is due to extensive journaling activity. Allocate more ECBs by increasing the number of journals allocated to CICS.
Buffer unavailable	The application has issued a journal request and the buffer is nearly full, or the journal is unavailable because of a volume switch.
Flushing buffer	The application is requesting a journal close and is flushing the buffers.
I/O block	The application has issued a journaling request with the WAIT option and is suspended until the I/O completes.
I/O complete	The application has issued a CLOSE request for a journal and is waiting for all active I/O operations to complete before completing the CLOSE.
JACD Get	The application has issued an inquiry request for a journal and the state of the journal is changing, due to switching from one journal to another. An extended delay may indicate that a journal I/O problem exists.
JACD Put	The application has issued a journal request and the state of the journal is changing, due to switching from one journal to another. An extended delay may indicate system I/O problems.
Switch wait Reason	The application has issued a journal switch and is waiting for data to be written to the journal before the request can be honored. It is essentially an I/O wait.

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Table 14-8 CICS Journal Control

Delay Type	Reason
Close done Reason	The wait is for the OPEN/CLOSE subtask to complete a close request. The application cannot influence this type of delay.
Detach	A task has requested shutdown and is waiting on the detaching of the journal subtask from the operating system. The application cannot influence this type of delay.
Ready	An outstanding write to operator with reply is causing the application to wait. This application cannot influence this type of delay.
Request done	The application is waiting on an OPEN or CLOSE request that another CICS task issued.
Switch	A system-related delay that the application cannot influence.
Tape2	A system-related delay that the application cannot influence. This delay indicates that a journal tape has been opened with open ahead and is not ready for I/O.

The following table describes the various types of CICS temporary storage delays, and the possible reasons for them.

Table 14-9 CICS Temporary Storage

Delay Type	Reason
Auxiliary storage	An application has attempted an unconditional write to temporary storage but sufficient auxiliary storage is unavailable. Determine if the application is attempting to place a piece of temporary storage, which is too large, to the facility.
Buffer	The application has attempted to write to temporary storage and all buffers are in use. Increase the number of temporary storage buffers by altering the buffer specification in the TS initialization parameter of the CICS system.
Extend	An application has made a request to extend temporary storage but some other task made the same request. A long delay may indicate a device or VSAM problem.
I/O	The application has made a request to temporary storage and is waiting for I/O completion.

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Table 14-9 CICS Temporary Storage

Delay Type	Reason
Queue	The application has made a request to the temporary storage queue, but the queue is already in use by another task that has a lock on the queue. Many transactions may be using the same temporary storage queue, or the same transaction has many instances running in parallel.
VSAM string	The application has made a temporary storage request and is waiting for a VSAM string.
Activity keypoint	The application is waiting for activity keypointing to complete. The delay may be significant when there are many temporary storage queues.

The following table describes the various types of CICS program control delays, and the possible reasons for them.

Table 14-10 CICS Program Control

Delay Type	Reason
Loader	The application has made a request to load another program into storage and the task has been suspended. If the application is loading the program for the first time, the delay is related to the I/O required to move the program into storage.

The following table describes the various types of CICS terminal control delays, and the possible reasons for them.

Table 14-11 CICS Terminal Control

Delay Type	Reason
Terminal I/O	The application has issued a request to read or write data to a terminal and the task is waiting until the operation completes.
DFHZGET failure	The application has requested terminal control and is waiting for completion of an internal storage control operation. Increase the amount of storage available for the CICS region.
LU62	The application has requested terminal control to perform an operation and an error occurred during the VTAM operation. This is a system-related delay that the application cannot influence.

The following table describes the various types of CICS DL/I resources delays, and the possible reasons for them.

Table 14-12 CICS DL/I Resources

Category	Reason
PSB schedule lock	The application is waiting for the PSB because another task has a lock on the PSB. Too many tasks are attempting to access the same PSB.
No DL/I thread	The application has made a request for DL/I data and no DL/I threads are available. A DL/I thread is required to access data within IMS databases. Increase the number of DL/I threads by modifying the CICS initialization parameters.
Termination request	The application is in termination but another task has requested the scheduling of a PSB. The application waits until the other task completes scheduling.
No PSB space	The application has made a DL/I request and there is no PSB pool space available. The task has obtained a DL/I thread but the attempt to load the PSB into the pool failed because other tasks performing DL/I are using the space.
No DMB space	The application has made a DL/I request and there is no DMB pool space available. The task has obtained a DL/I thread and the PSB has been loaded. The attempt to load the DMBs, referenced in the PSB, into the pool failed because other tasks performing DL/I are using the space.
DL/I PSB/DMB load	A hardware error occurred when the application attempted to load a PSB or DMB.
DBCTL user wait	The application has made a DL/I request and is waiting for the DBCTL address space to service the request.

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15

Using InTune in an IMS Environment

Delays processing IMS calls are usually caused by improperly designed applications and databases, inadequate database indexing, and programming errors. InTune can help identify the programs and IMS databases, segments, and calls that require attention. InTune is compatible with IMS releases 3.1, 4.1, and 5.1.

This chapter discusses the following topics:

Analyzing IMS Data 15-2
Analyzing IMS Batch Performance Information 15-7
IMS Region Types 15-13

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Analyzing IMS Data

InTune enables you to analyze IMS data to the IMS statement level. Use the following steps to see the IMS statements for an IMS job:

1. Set up your monitoring criteria so that the Number of samples to collect field contains a number in the range of 3000 to 10000.

2. Invoke the monitor using the **I**nvoke line command.

3. Analyze the data using one of the analysis line commands, A, AL, AA, or AW.

4. Select Option 5 from the Interactive Analysis menu.

   The DataView panel (Figure 15-1) is displayed:

Figure 15-1 DataView for an IMS Environment

```
InTune ---------------------------- DataView ------------------- ROW 1 to 4 of 4
COMMAND ===>                                                    SCROLL ===> CSR

Primary commands: LINklist on/off                               Profile: IMS
                                                                Options: NORMAL
   Line commands: S - Select                                   Linklist: ON


LC DD name  Dataset name                                    Delay% Visual
   ________ ____________________________________________ ______ __________
>-------------------------------------------------------------------------------
__ .IMS     IMS Statement Delay                              23.88 =========>
S_ INVDATA  TUN.TEST.INVDATA                                  1.45
__ INVINDX  TUN.TEST.INVINDX                                  1.11
__ INVTRAN  TUN.TEST.INVTRAN                                  0.55
__ DFSRESLB IMS.V5100.RESLIB                                  0.00
__ IEFRDER  IMSLOG                                            0.00
__ IMS      IMS.V5100.PSBLIB                                  0.00
__ IMS      IMS.V5100.DBDLIB                                  0.00
__ LINKLST  SYS1.LINKLIB                                      0.00
```

5. Type S next to one of the DD statements and press **Enter**.

6. An enhanced version of the Dataset Details panel (Figure 15-2) is displayed. In this example, the INVDATA DD statement was selected.

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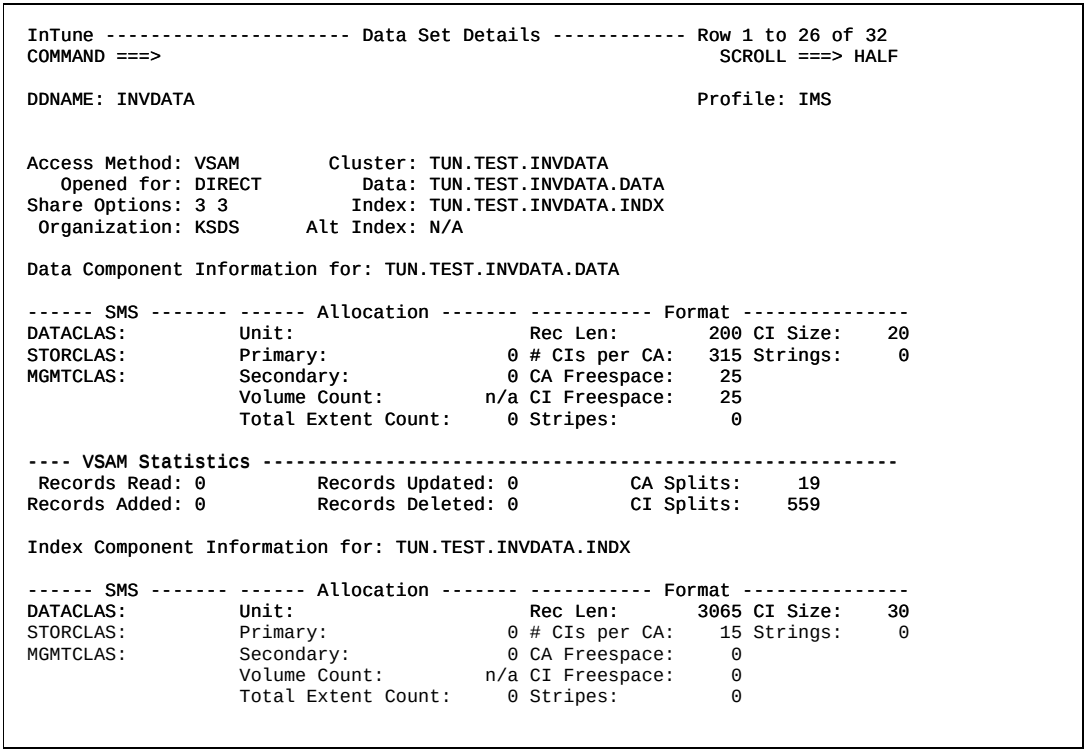
Figure 15-2 Dataset Details for a VSAM Data Set



```
InTune ---------------------- Data Set Details ------------ Row 1 to 26 of 32
COMMAND ===>                                                  SCROLL ===> HALF

DDNAME: INVDATA                                             Profile: IMS


Access Method: VSAM        Cluster: TUN.TEST.INVDATA
   Opened for: DIRECT          Data: TUN.TEST.INVDATA.DATA
Share Options: 3 3            Index: TUN.TEST.INVDATA.INDX
 Organization: KSDS       Alt Index: N/A

Data Component Information for: TUN.TEST.INVDATA.DATA

------ SMS ------- ------ Allocation ------- ----------- Format ---------------
DATACLAS:          Unit:                      Rec Len:        200 CI Size:    20
STORCLAS:          Primary:                 0 # CIs per CA:   315 Strings:     0
MGMTCLAS:          Secondary:               0 CA Freespace:    25
                   Volume Count:          n/a CI Freespace:    25
                   Total Extent Count:      0 Stripes:          0

---- VSAM Statistics -----------------------------------------------------------
 Records Read: 0          Records Updated: 0          CA Splits:     19
Records Added: 0          Records Deleted: 0          CI Splits:    559

Index Component Information for: TUN.TEST.INVDATA.INDX

------ SMS ------- ------ Allocation ------- ----------- Format ---------------
DATACLAS:          Unit:                      Rec Len:       3065 CI Size:    30
STORCLAS:          Primary:                 0 # CIs per CA:    15 Strings:     0
MGMTCLAS:          Secondary:               0 CA Freespace:     0
                   Volume Count:          n/a CI Freespace:     0
                   Total Extent Count:      0 Stripes:          0
```

Table 15-1 describes the fields in this panel.

Table 15-1 Dataset Details Fields

Field	Description
DD Name	DDNAME used to allocate the data set.
Organization	Physical organization of the data stored in this data set. Possible values are KSDS, ESDS, or RRDS.
Dataset name	Full name of the data set. If the data set organization is KSDS, InTune displays the names of the DATA and INDEX components.
Volser	First volume serial of the data set.
Unit	First device address of the data set.
Opened for	Intention of the program when performing I/Os for this data set. Possible values are READ, WRITE, and DIRECT.

Table 15-1 Dataset Details Fields

Field	Description
Logical record length	Specified length of the records that reside in this data set.
Share Options	Displays how an alternate index's data or index component is shared among users. You can select one of the following numbers: • The data set can be shared by any number of users for read processing, or the data set can be accessed by only one user for read and write. • The data set can be accessed by any number of users for read processing and it can also be accessed by one user for write processing. • The data set can be fully shared by any number of users. • The data set can be fully shared by any number of users, and buffers used for direct processing are refreshed for each request.
Data CI size	Size of the Control Interval for the data in this data set.
Number of CIs in a CA	Count of CIs allocated within a control area for the data in this data set.
Index levels	VSAM KSDS data sets are indexed using a multilevel structure. The number of levels can have an impact on the performance of the data set if there are insufficient index buffers.
RPL strings	Number of strings for the data set. This indicates the number of concurrent operations that may be started for the data set.
Index buffers	Number of buffers used to perform I/O for the index component.
Data buffers	Number of buffers used to perform I/O for the data component.
Index EXCPs	Number of EXCPs for the INDEX component during the monitored period.
Data EXCPs	Number of EXCPs for the DATA component during the monitored period.
Records retrieved	Total number of records retrieved during the monitored period.
Records written	Number of records written to the data set during the monitored period.
CI splits	Number of times that the control interval was split due to lack of space.
CA splits	Number of times that the control area was split due to lack of space.
CI freespace	Percentage of free space in the control interval. Defined when the data set was created.
CA freespace	Percentage of free space in the control area. Defined when the data set was created.

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Table 15-1 Dataset Details Fields

Field	Description
File uses Shared Resources	The file uses VSAM local and global shared resources (LSR/GSR) and some values are invalid in the main display. When the message File uses Shared Resources appears, values described below replace those marked n/a.
Pool ID	Pool identifier used to satisfy requests for this file. (LSR/GSR)
Buffer Size	Size of the buffer used from the pool identified by Pool ID. (LSR/GSR)
Num Buffers	Number of buffers available in the shared pool. (LSR/GSR)
Hit Ratio	Percentage of READ requests that were satisfied from the buffer pool without an EXCP. (LSR/GSR)
Steal Writes	Number of non-user-initiated WRITES that were initiated for this buffer pool. A value of greater than 0 in this field can indicate a serious performance problem. (LSR/GSR)

7. Press **End** to return to the DataView panel.

8. To select the .IMS DD statement, type S next to it and press **Enter**.

   The IMS Statements panel (Figure 15-3) is displayed:

Figure 15-3 IMS Statements Panel

```
InTune ------------------------ IMS Statements --------------- ROW 1 to 7 of 7
COMMAND ===>                                                   SCROLL: CSR

Primary commands: DBDname, PSBname                             Profile: IMS
                                                                  Mode: PSBNAME
   Line commands: S - SSA

LC PSB Name PCB# DBD Name Segment  Call P-Opts Actv% Wait% Totl% Visual
   ________ ____ ________ ________ ____ ______ _____ _____ _____ __________
-------------------------------------------------------------------------------
__ INV2200     2 INVDBD   INVENSEG ISRT A       1.78 17.07 18.86 ========>
__ INV2200     2 INVDBD   INVENSEG GHU  A       2.79  0.11  2.90 >
__ INV2200     2 INVDBD   INVENSEG REPL A       0.78  0.00  0.78
__ INV2200     2 INVDBD   INVENSEG DLET A       0.55  0.00  0.55
__ INV2200     2 INVDBD   INLOCSEG GHU  A       0.44  0.00  0.44
__ INV2200     2 INVDBD   INLOCSEG REPL A       0.22  0.00  0.22
__ INV2200     2 INVDBD   INLOCSEG DLET A       0.11  0.00  0.11
******************************** END OF TABLE ********************************
```

The IMS Statements panel has two modes. The information displayed depends on the mode you select. Select a mode by issuing one of the following primary commands:

PSBNAME

The default mode is PSBNAME mode. In this mode, IMS calls are sorted by PSB name. InTune displays all calls during the monitored period sorted by the activity level associated by that call. In PSBNAME mode, you can display more detailed information by using the S (SSA) line command to display the Segment Search Argument panel (Figure 15-4).

Figure 15-4 Segment Search Argument Panel

```
InTune ------------- Segment Search Arguments ---------------- ROW 1 to 1 of 1
COMMAND ===>                                                  SCROLL ===> CSR

                                                              Profile: IMS
PSBNAME -- PHDAMINQ   DBDNAME -- CUSTHDAM   (GU)

SSA# Segment  Field    Operator Cmd
____ ________ ________ ________ ___
--------------------------------------------------------------------------------
   1 CUSTOMER CUSTID   =
```

DBDNAME

All activity associated with the database is summarized in a single row. Figure 15-5 shows the IMS Statements panel in DBDNAME mode.

Figure 15-5 IMS Statements Panel for DBDNAME Mode

```
InTune ------------------------ IMS Statements --------------- ROW 1 to 1 of 1
COMMAND ===>                                                  SCROLL ===> CSR

Primary commands: DBDname, PSBname                            Profile: IMS
                                                                 Mode: DBDNAME


DBD Name Actv% Wait% Totl% Visual
________ _____ _____ _____ __________
--------------------------------------------------------------------------------
INVDBD    6.69 17.18 23.88 ========>
```

Table 15-2 describes the fields displayed in the IMS Statements panel for PSB Name mode.

Table 15-2 IMS Statements Fields

Statement	Description
PSB Name	Name of the PSB generated to support this application. The PSB is comprised of one or more PCBs.
PCB#	Relative offset of this PCB from the start of the PSB.
DBD Name	Name of the IMS database that was accessed.
Segment	Name of the segment that was accessed by the application program.
Call	Type of operation that is being performed within the IMS call.
P-Opts	Processing options generated in the PCB during the PSBGEN.
Actv%	Percentage of the monitored period that InTune detected that the processing of the IMS statement was using CPU.
Wait%	Percentage of the monitored period that InTune detected that the program waited for IMS data to be returned.
Totl%	Sum of the Actv% and Wait% fields.
Visual	Visual representation of the Totl% field.

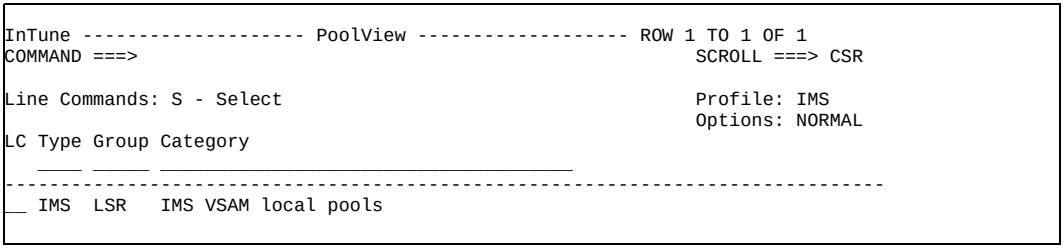
Analyzing IMS Batch Performance Information

InTune provides additional information for IMS batch programs. IMS batch operates entirely in a single address space. Database operations are controlled by IMS routines using either a VSAM local shared resource pool or IMS ISAM/OSAM pools. Use the following steps to access InTune's statistics on the use of these pools.

1. Select Option 8 from the Interactive Analysis menu.

   The PoolView panel (Figure 15-6) is displayed:

Figure 15-6 PoolView for an IMS Environment



PoolView lists the shared pools used in the batch job.

Table 15-3 describes each field in PoolView.

Table 15-3 PoolView Fields

Statement	Description
Type	Type of pool, either IMS or VSAM.
Group	Defines the group as LSR, GSR, or OSAM. LSR refers to VSAM Local Shared Resources where the buffer pool is maintained in the user's storage (PRIVATE). GSR refers to VSAM Global Shared Resources where the buffer pool is maintained in OS/390 common storage (ECSA). OSAM is the IMS Overflow Specific Access Method.
Category	Literal name of the pool.

2. Use the **S**elect line command to link to the Shared Pools panel (Figure 15-7). This panel displays all of the unique buffer pools defined to the overall pool.

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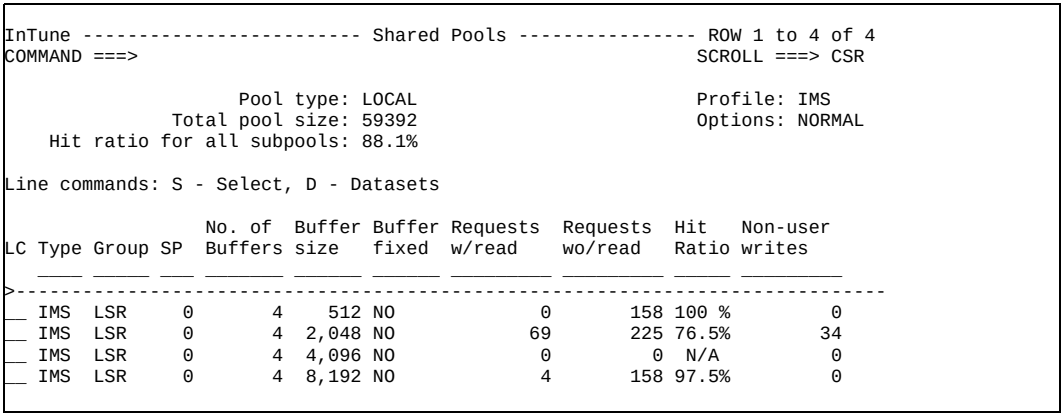
Figure 15-7 Shared Pools Panel



```
InTune ------------------------- Shared Pools ---------------- ROW 1 to 4 of 4
COMMAND ===>                                                   SCROLL ===> CSR

                     Pool type: LOCAL                          Profile: IMS
                Total pool size: 59392                         Options: NORMAL
    Hit ratio for all subpools: 88.1%

Line commands: S - Select, D - Datasets

                  No. of  Buffer Buffer Requests  Requests  Hit   Non-user
LC Type Group SP  Buffers size   fixed  w/read    wo/read   Ratio writes
   ____ _____ ___ _______ ______ ______ _________ _________ _____ _________
>-------------------------------------------------------------------------------
__ IMS  LSR     0       4    512 NO             0       158 100 %         0
__ IMS  LSR     0       4  2,048 NO            69       225 76.5%        34
__ IMS  LSR     0       4  4,096 NO             0         0  N/A          0
__ IMS  LSR     0       4  8,192 NO             4       158 97.5%         0
```

Table 15-4 on page 15-9 describes each field in the Shared Pools panel.

Table 15-4 Shared Pools Fields

Statement	Description
Pool type	LOCAL or GLOBAL. Local pools are used exclusively for IMS batch jobs and are located in the batch region. GLOBAL pools are located in CSA.
Total pool size	Total size of all the allocated buffers for all the buffer pools for this shared pool.
Hit ratio for all subpools	Measure of buffer pool performance. A high hit ratio means that a high percentage of reads were satisfied from the buffer pools without having to access external media. The hit ratio is calculated as follows: 100 x (Retrieves wo/read / (retrieves w/read + retrieves wo/read))
Type	Type of pool, VSAM or IMS.
Group	Location of the subpool. LSR is in the user region, GSR is in CSA.
SP	Identifier of the subpool.
No. of Buffers	Number of virtual buffers for this subpool.
Buffer size	Size in bytes of each buffer residing in this subpool.
Buffer fixed	Indicates whether the buffers are fixed in storage for this buffer pool.

Table 15-4 Shared Pools Fields

Statement	Description
Requests w/read	Number of retrieves that were satisfied with an access to external media.
Requests wo/read	Number of retrieves that were satisfied from within the buffers in the pool. No I/O was necessary.
Hit Ratio	Percentage of the monitored period that READ requests were satisfied without a physical I/O.
Non-user writes	Writes initiated by VSAM to make free space in this pool. These types of writes are very expensive and indicate that the pool may be too small. They are also called VSAM steal writes.
Scroll right to display the following fields:	
User init. writes	Writes by VSAM initiated by the user for synchronization processing.
Retrieves by RBA	Number of retrieves by relative byte address (RBA).
ESDS inserts	Number of inserts to the Entry Sequenced Data Set (ESDS).
Retrieves by KEY	Number of retrieves by key to a Key Sequenced Data Set (KSDS).
KSDS inserts	Number of inserts to a Key Sequenced Data Set (KSDS).
Buffer alters	Number of times a buffer was altered by VSAM.
VSAM gets	Number of VSAM GET requests.
Buffer searches	Number of VSAM search buffer requests.
No. PLH in chain	Number of Placeholders (PLH) in lock chain.
Error buffs in pool	Current number of error buffers in pool.
Max error buffs	Largest number of error buffers ever in the pool since the pool was created.

From the Shared Pools panel, you can display further detail using one of the line commands:

- The **S**elect line command displays the VSAM Pool Details panel (Figure 15-8).
- The **D**atasets line command displays the Pooled Datasets panel (Figure 15-9 on page 15-12).

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VSAM Pool Details displays the same information as shown in Shared Pools, but in a detail format.

Figure 15-8 VSAM Pool Details Panel

```
InTune --------------------------- VSAM Pool Details ---------------------
COMMAND ===>

                      Pool type: IMS                          Profile: IMS
                     Pool group: LSR
                        Pool ID: 0
               Number of buffers: 4
                     Buffer size: 512
          Placeholders in chain: 0
                      Hit Ratio: 100 %
      Requests requiring a read: 0
   Requests satisfied from pool: 158
         User initiated writes: 0
      Non-user initiated writes: 0
                Retrieves by RBA: 0
                    ESDS inserts: 0
                Retrieves by key: 0
                    KSDS inserts: 0
                   Buffer alters: 0
                       VSAM GETS: 0
                 Buffer searches: 0
          Error buffers in pool: 0
          Maximum error buffers: 0
```

3. Press END to return to Shared Pools.

4. Type D to display the Pooled Data Sets panel (Figure 15-9). Pooled Data Sets displays information about any VSAM data set using the specified pool.

Figure 15-9 Pooled Data Sets Panel

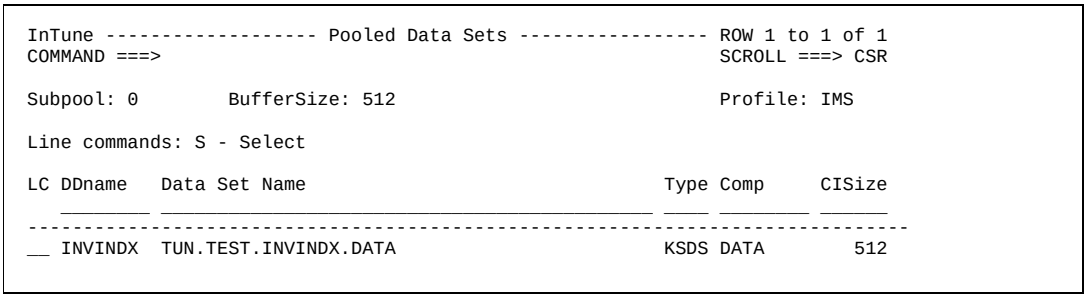

Table 15-5 describes the fields on the Pooled Data Sets panel.

Table 15-5 TranView Fields

Field	Description
Subpool	The identification number of the VSAM subpool.
Buffer size	The size in bytes of each buffer in the subpool.
DDname	The DDNAME used to allocate the data set.
Data Set Name	The full name of the data set.
Type	May be one of the following VSAM data set types: • KSDS - A key sequenced data set that always accompanied by an INDEX component. The index component does not have to use the same subpool. • ESDS - An entry sequenced data set.
Comp	The VSAM component might be one of the following: • DATA - Contains real customer data. • INDEX - Contains indexing information.
CISize	The Control Interval Size. The unit of transfer for VSAM data to and from storage. It is always a multiple of 512 bytes.

You can display data set details about any data set in Pooled Data Sets by using the **S**elect line command.

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IMS Region Types

IMS processing can occur in a number of environments. InTune enables you to resolve performance problems and is capable of monitoring each of the following types of IMS processing:

IMS Batch Processing

IMS processing might occur in a batch region. During this type of processing, all IMS activity occurs in one region. A batch program may process all full function IMS databases, but might not access DEDBs or MSDBs. Batch programs are used when a large number of updates must be done, or when large reports must be created. Batch programs do not require a control region and other programs may not have concurrent access to the databases used by the job.

IMS Batch Message Program

IMS processing might occur in a batch region that is connected to a control region or DBCTL region. This type of processing is used also when a large number of records are updated or a report is created. This type of processing requires the control region. When you use a control region, recovery is made easier and other programs are allowed to access the databases concurrently.

IMS Message Processing Program

IMS processing might occur in a region called a message processing region or MPR. The MPR processes transactions created in an online environment. This means that a user may be sitting at a terminal entering interactive work and the IMS control region schedules work in the MPR. Normally the output message produced by this kind of IMS processing is destined for a terminal user. This type of processing requires a control region to control the terminal I/O and a DBCTL region to control the access to the databases. Other programs may access the databases while messages are being processed.

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IMS Fast Path Program

IMS processing might occur in a special region called a Fast Path region. These regions are usually devoted to processing online transactions that require very fast response times. Programs running in this environment normally access Fast Path databases such as Data Entry Databases (DEDBs) or Main Storage Databases (MSDBs), but might also access full function IMS databases. They have similar requirements to MPR processing.

CICS Transaction Access

IMS processing might occur on behalf of a transaction that is executed in a CICS environment. In this environment, the IMS data is either locally attached or attached by using a DBCTL region. The CICS transaction processing is similar to IMS. You enter a query or update and the IMS connection reads or alters the database. If the database is accessed using a DBCTL, other programs may access the data concurrently. If the database is locally attached, only CICS shared database processing may occur concurrently.

CICS Shared Database Processing

IMS processing might occur in a CICS environment using a batch job. You can run a shared database program only in a local DL/I environment. The batch job runs in its own region, but the CICS region synchronizes the updates to the IMS databases using “mirror” transactions to process each request of the batch job. Shared database programs may use full function IMS databases.

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Using InTune with a Non-IBM Database

This chapter describes how to best use InTune with the following non-IBM databases:

- Adabas
- CA-Datacom
- Natural

This chapter discusses the following topics:

Using InTune with Adabas 16-2
Using InTune with CA-Datacom 16-4
Using InTune with Natural 16-5

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Using InTune with Adabas

InTune provides a list of Adabas statements detected during the monitored period. To display these statements after monitoring a job:

1. Set up your monitoring criteria so that you select the correct version of Adabas from the ADABAS Monitoring Criteria window. See “Additional Monitoring Criteria” on page 5-16 for more information.

2. Invoke the monitor using the **I**nvoke line command.

3. Analyze the data using one of the analysis line commands (A, AL, AA, or AW).

4. Select Option 5 from the Interactive Analysis menu. Make sure that **.Adabas** is displayed in the DD Name field.

5. Type S next to **.Adabas.**

   The ADABAS Statements panel (Figure 16-1) is displayed:

Figure 16-1 ADABAS Statements Panel

```
InTune ---------------------- ADABAS Statements ----------- ROW 1 to 14 of 14
COMMAND ===>                                                 SCROLL ===> CSR

   Line commands: S - Search Buffer                              Profile: ADA2

File ID   CMD      CMD-ID CMD-IDX    Actv% Wait% Totl% Visual
_________ ________ ______ __________ _____ _____ _____ __________
-------------------------------------------------------------------------------
0030      L3       .      1800010100  0.00 53.75 53.75 ========>
0070      L3       ..     2180010100  0.00 30.03 30.03 ====>
0060      L3       ..     2530010100  0.00  2.35  2.35
0041      S1       .      2400010100  0.00  1.56  1.56
0060      RC       ..     2530010100  0.00  0.18  0.18
0070      RC       ..     2180010100  0.00  0.15  0.15
0015      S1       ..     2330010100  0.00  0.14  0.14
0041      RC       .      2400010100  0.00  0.06  0.06
0070      L3       ..     2180000100  0.00  0.02  0.02
0015      RC       ..     2330010100  0.00  0.02  0.02
0030      L3       .      1800000100  0.00  0.01  0.01
0013      L1       .-     1760010100  0.00  0.01  0.01
0030      RC       .      1800010100  0.00  0.00  0.00
0015      S1       ..     2330000100  0.00  0.00  0.00
```

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Table 16-1 describes the fields in the ADABAS Statements panel.

Table 16-1 Adabas Statements Fields

Field Name	Description
File ID	Decimal representation of the ADABAS File ID to be accessed. This number may be in the range of 0 to 255.
CMD	One of the Adabas commands used to access ADABAS databases. This field displays the database access command. Possible values in this field, and the descriptions of these values, are as follows: • **A1 -** Update record(s) (hold option). • **BT** - Remove database updates for ET logic users. • **CL** - End/ET session and update database. • **C1** - Write Command ID, PLOG, RABN checkpoint, buffer flush option. • **C5** - Write user data on SIBA/PLOG. • **ET** - End and save current transaction. • **E1** - Delete record (hold option) or Refresh file. • **HI -** Prevent record update by other users. • **LF** - Read characteristics of all fields in file. • **L1 -** Read record of specified ISN. • **L4** - Read and hold, “wait for held record/issue return code” option. • **L2** - Read records in physical order. • **L5** - Read in physical order and hold, “wait/issue return code” option. • **L3** - Read records in descriptor value order. • **L6** - Read in descriptor value order with “wait/issue return code” option. • **L9** - Read ISNs of specified descriptor. • **N1** - Add new database record with ADABAS-assigned ISN. • **N2** - Add new database record with user-assigned ISN. • **OP** - Open ET/ADABAS STAR session. • **RC** - Release one or more command IDs or a global Format ID for the issuing user. • **RE** - Read ET data for this or all users. • **RI** - Release held record and ISN. • **S1/S4 -** Return count and ISNs of records meeting the search criteria. • **S2** - Return count of records and ISNs in user-specified order. • **S5** - Return or save a list of coupled ISNs for the specified file. • **S8** - AND, OR, or NOT tow ISN lists from the same file. • **S9** - Sort ISN list in ascending ISN or descriptor-specified sequence.

Table 16-1 Adabas Statements Fields

Field Name	Description
CMD-ID	Identifies users, their transactions, and decoded formats for reuse by subsequent instructions. The Alphanumeric Command ID is either user-specified or system-generated and can be either local or global to specify either internal or globally accessible decoded formats.
CMD-IDX	Same value as the CMD-ID field in hexadecimal format.
Actv%	Percentage of the monitored period that the processing of the Adabas statement used CPU.
Wait%	Percentage of the monitored period that the program waited for ADABAS data to be returned.
Totl%	Summation of the Actv% and Wait% fields.
Visual	Graphical representation of the Totl% field.

Using InTune with CA-Datacom

InTune provides a list of CA-Datacom statements detected during the monitored period. To display these statements after monitoring a job:

1. Set up your monitoring criteria so that you select the correct version of CA-Datacom from the CA-DATACOM Monitoring Criteria window. See “Setting Up a Monitor Definition” on page 5-1 for more information.

2. Invoke the monitor using the **I**nvoke line command.

3. Analyze the data using one of the analysis line commands (A, AL, AA, or AW).

4. Select Option 5 from the Interactive Analysis menu. Make sure that **.DCOM** is displayed in the DD Name field.

5. Type S next to **.DCOM**.

6. The DATACOM Statements panel (Figure 16-2) is displayed:

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Figure 16-2 DATACOM Statements Panel

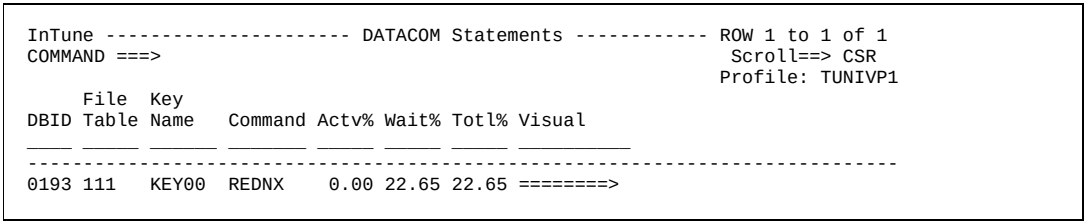

Table 16-2 describes the fields in the CA-DATACOM Statements panel.

Table 16-2 CA-DATACOM Statements Fields

Field Name	Description
DBID	Three- or four-digit numeric identifier of the CA-Datacom database.
File Table	Three-character name of the CA-Datacom table, identifying the logical table being accessed.
Key Name	Five-character alphanumeric name of the search key being used to locate a record in the CA-Datacom database.
Command	Five-character CA-Datacom command used to access Datacom databases. InTune detected the commands displayed in this field during the monitored period.
Actv%	Percentage of the monitored period that the processing of the CA-Datacom statement used CPU.
Wait%	Percentage of the monitored period that the program waited for CA-Datacom data to be returned.
Totl%	Summation of the Actv% and Wait% fields.
Visual	Graphical representation of the Totl% field.

Using InTune with Natural

InTune allows you to select how to display the information collected when a Natural program is monitored. You can view either the Natural executor programs (by which Natural supervises the execution of Natural 4GL routines), or the Natural routines themselves.

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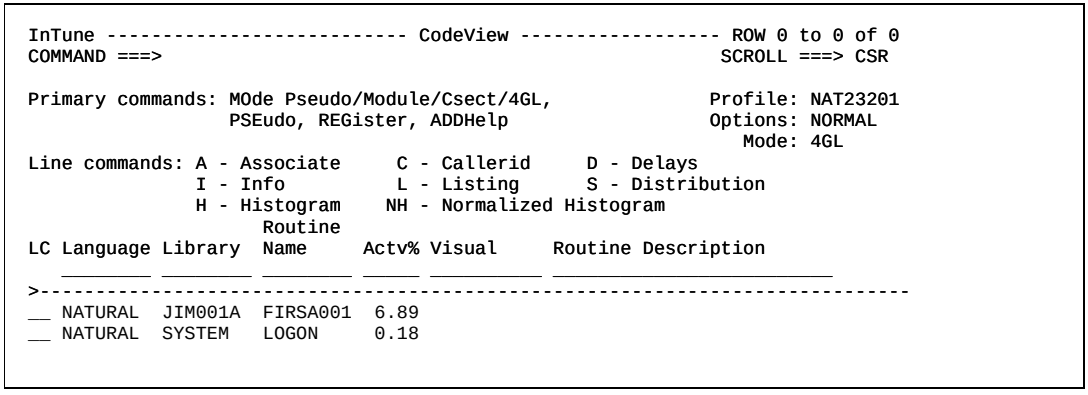
1. Set up your monitoring criteria so that you select the correct version of Natural from the Natural Monitoring Criteria window. See “Setting Up a Monitor Definition” on page 5-1 for more information.

2. Invoke the monitor using the **I**nvoke line command.

3. Analyze the data using one of the analysis line commands (A, AL, AA, or AW).

4. Select Option 2 from the Interactive Analysis menu to display the CodeView panel (Figure 16-3). Issue the MODE 4GL primary command to display the activity associated with Natural routines.

Figure 16-3 CodeView Panel with Natural



CodeView normally displays the activity of the Modules and Csects that are supervising the running of the Natural program.

5. Type MO 4GL in the COMMAND line.

6. Press **Enter**.

The Natural Programs panel is displayed.This panel displays the activity of Natural routines that were executing at the time the monitor was run. These routines exist in ADABAS databases.

The Language, Library, and Routine Name fields are displayed, along with a description of the routine, if available. This information is important when multiple copies of a routine are maintained.

7. Type H or NH.

8. Press **Enter**.

   The 4GL Histogram panel (Figure 16-4) shows the activity of each statement in the routine:

Note

The 4GL Histogram panel may also be displayed from the DelayView panel.

Figure 16-4 4GL Histogram Panel

```
InTune ----------------------- 4GL Histogram --------------- ROW 1 to 19 of 77
COMMAND ===>                                                 SCROLL ===> CSR

  Language --- @NATURAL                                       Profile: NAT23201
                                                            Normalized: NO

Routine  Stmt  Actv% Visual
________ _____ _____ __________
--------------------------------------------------------------------------------
FIRSA001     0  2.09
             0  1.12
            20  0.13
            20  4.25
            20 11.19
            20  0.09
            21  7.44
            24  0.46
            24 12.32
            27  3.17
            29  0.75
            30  4.19
            30  6.32
            30  0.08
            31  0.48
```

Table 16-3 describes the fields in the 4GL Histogram panel.

Table 16-3 4GL Histogram Fields

Field Name	Description
Routine	The name of the 4GL routine, obtained from the 4GL language processor exit.
Stmt	The statement number of the currently executed statement of the 4GL routine. This statement is obtained from the 4GL language processor exit.
Actv%	The percentage of the monitored period that InTune detected a 4GL statement in control. The statement may or may not have been consuming CPU at the time.
Visual	Graphical representation of the Pct field.

A

How InTune Monitors an Application

This appendix describes the internal operation of InTune. The following topics are discussed:

InTune Address Space Structure A-2
Example Monitoring Session A-7
InTune and OS/390. . . . . A-12

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InTune Address Space Structure

InTune uses a tri-address space structure that communicate through several forms of inter-address space communication. Each address space performs specific functions that enable InTune to monitor and analyze a target application. These three address spaces are:

- The TSO Client Space
- The InTune Server Space
- The Target Address Space

The InTune Address Space Structure diagram (Figure A-1) illustrates how each address space interacts.

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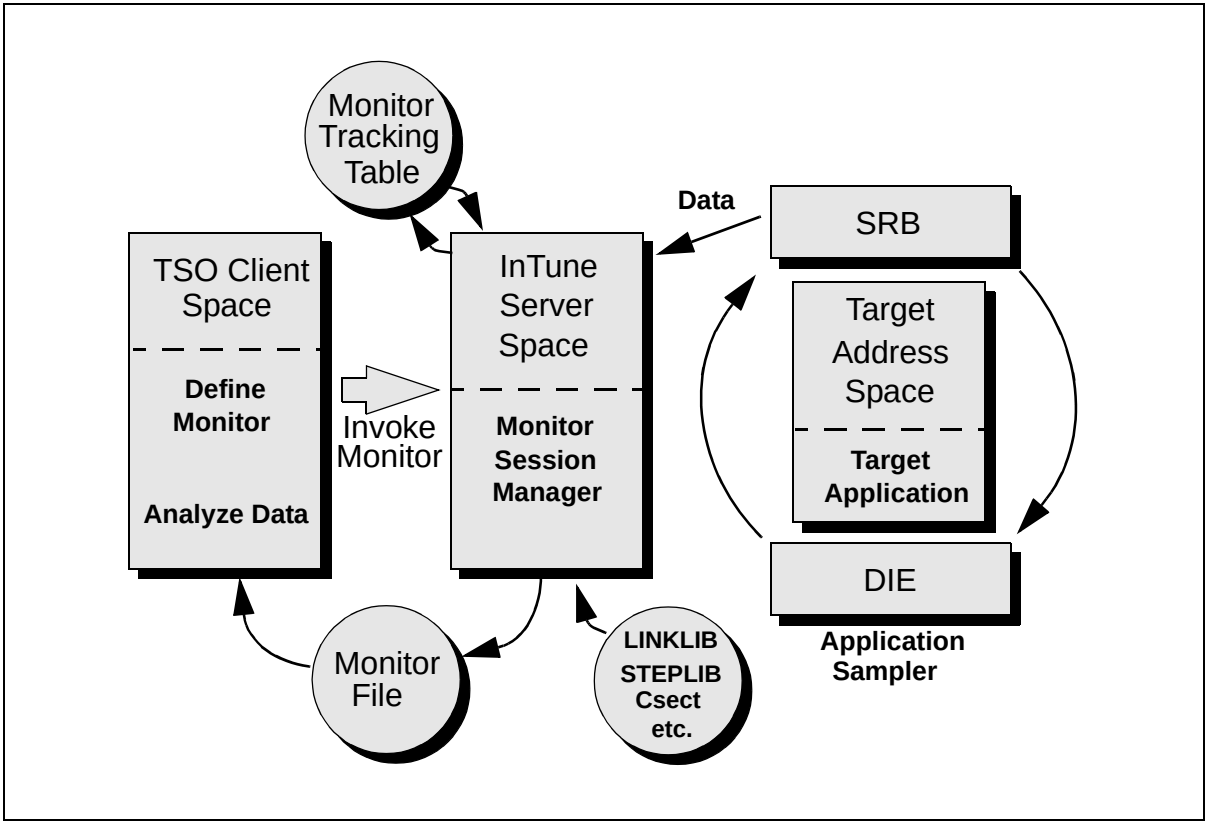
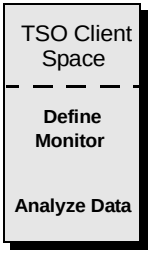
Figure A-1 InTune Address Space Structure Diagram



TSO Client Space



The TSO Client Space is the user's interface to InTune. This component runs under TSO/ISPF and assists users in defining how applications are to be monitored, invoking the monitoring of applications, and analyzing of the results.

When an application is monitored, the resulting data is stored in the user's User Information File. The data can be analyzed at any time. The InTune Server Space does not need to be active to analyze data.

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User Information File

There is a separate User Information File for each InTune TSO Client. InTune stores the monitor definitions, monitor session information, listing registration information, InTune user settings, and other user-related information here. Sampling results are stored in a monitor data set.

Monitor Data Set

All information collected during a monitor session, along with other OS/390 performance and diagnostic information, is stored in the monitor data set. There is a single monitor data set for each monitor session. The InTune TSO Client uses the information stored in the monitor data set to analyze the performance of your application.

Invoking a Monitor Session

When you invoke a monitor definition, a monitor request is sent to the InTune Server Space. The status of the request is either active, if the target application is running, or pending, if the target application is not running.

Monitor Persistence

Monitor requests are logged to a Global Information File (GIF). This allows for persistence of the request, even if the InTune Server Space is recycled or if an IPL is performed. When the Server Space is started via batch job or during IPL, it reads the GIF and reinstates any waiting monitor requests.

XCF (Cross-system Coupling Facility) is used to send requests from one system within the XCF group to another. In cases where XCF cannot be used, the GIF is used as a secondary communications mechanism. This allows one system to schedule a request to another system provided there is shared DASD available between the two systems for both the Global Information File (GIF) and the Monitor data sets.

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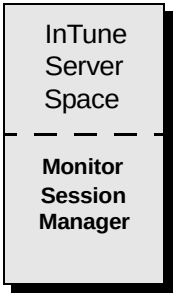
InTune Server Space

The InTune Server Space manages pending and active Monitor Sessions, OS/390 interfaces, and any global storage used by InTune. Multiple monitoring sessions can be run concurrently up to the limit set by the InTune administrator.

Monitor Session Manager

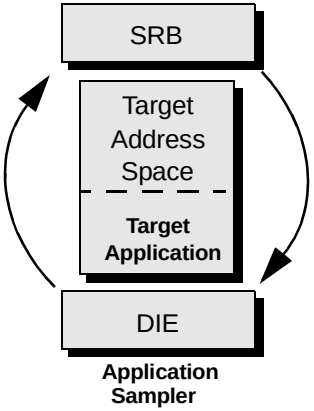


The Monitor Session Manager runs as part of the InTune Server Space, and has several functions:

- Controls the initialization and shutdown of a monitor session.
- Reads the STEPLIB and LINKLIB load libraries to resolve Csect names and displacements within load modules. Gathers other pertinent information that is unavailable to the Application Sampler.
- Writes samples from the Csect Resolver and the Application Sampler to the monitor data set.

There is a separate Monitor Session Manager for each pending or active monitor request. The Monitor Session Manager terminates when a monitor session completes, and all system resources are freed.

Target Address Space



The Target Address Space is where the application to be monitored runs. You do not need to specify the target address space when creating a monitor definition.

InTune automatically detects the type of address space it is monitoring. If you schedule a monitor session for a CICS application with programs written in Cobol accessing a DB2 database, InTune automatically determines the CICS and DB2 levels and will adjust itself accordingly to obtain the correct data.

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Application Sampler

The Application Sampler is the only component of InTune which runs in the address space of the target application. This component runs in the address space of the desired job as a DIE/SRB routine. The Application Sampler determines which program is running for each task, where the program was executing, and if and why it was waiting. These samples are passed to the Monitor Session Manager to be written to the monitor data set. The Application Sampler runs outside of the application being monitored, eliminating the need to:

- Load InTune code in the target address space
- Allocate and open InTune files in the target address space
- Obtain private storage in the target address space

InTune is an outside observer collecting samples, leaving the application to run normally. No JCL or program changes, additional private storage requirements, or additional security considerations are required. The application being monitored is a passive participant and is not affected by the monitoring process.

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Example Monitoring Session

To better understand how InTune operates, we will present an example monitoring session.

Defining the Monitor Profile

The first step in monitoring an application is to tell InTune what you are looking for. You create a monitor definition with the Monitoring Criteria panel (Figure A-2). The minimum information required is the name of the job to be monitored. Optionally, other selection criteria can be provided to narrow the focus of the monitor session. See Chapter 5, “Setting Up a Monitor Definition” on page 1 for complete information.

Figure A-2 Monitoring Criteria Panel

```
InTune ---------------------- Monitoring Criteria ----------------------------
COMMAND ===>

Specify parameters for monitoring session:                  Profile: TUNIVP1
    Description ===>
  Batch reports ===> N (Y or N)
Monitor dataset ===> '&USERID.&PROFILE.&SYSDATE.&SYSTIME'

Specify target name: (Job required)
   Job ===> TUNIVP1  Step ===>          Pstep ===>          Prog ===>
Specify target systems in SYSPLEX: (default is local system only)
System ===>                 >                   >                   >

Specify parameters for target job name:
        Monitor duration ===> 60     (seconds or STEP)
       Number of samples ===> 6000
  Delay after step start ===> 0      (seconds)
DD name for load modules ===>
      Monitor time range ===> 0000  ===> 0000 (hhmm 24h clock)

Tab to the environment for additional monitoring options and press
ENTER to select:   All Jobs  CICS  IMS  ADABAS   Natural  CA-Datacom

Press END to save changes; enter CANCEL to exit without saving
```

Invoking the Monitor

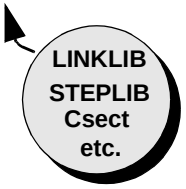
When you invoke a monitor definition, it becomes a monitor request. The InTune TSO Client calls the InTune Server Space, using the information from the monitor definition, to schedule the monitor session. The request is written to the Monitor Tracking File, which keeps the monitor request active, even if the Server Space or the entire system are shut down.

See Chapter 6, “Invoking a Monitor”.

Initializing the Monitor Session

When a monitor session is scheduled, a set of control blocks is allocated in pageable common storage (ECSA), and the Monitor Session Manager is attached.

Monitor Session Manager



The Monitor Session Manager consists of three tasks:

- **Monitor Session Controller:** Controls the initialization and shutdown of the Monitor Session.
- **Csect Resolver:** Reads the STEPLIB and LINKLIB load libraries to resolve Csect names and displacements within load modules.
- **Sample Control:** Writes samples from the Csect Resolver and the Application Sampler to the monitor data set. This subtask will open the data set with the name determined by the InTune TSO Client. If the profile is new, the InTune TSO Client allocates the data set before scheduling the monitor session.

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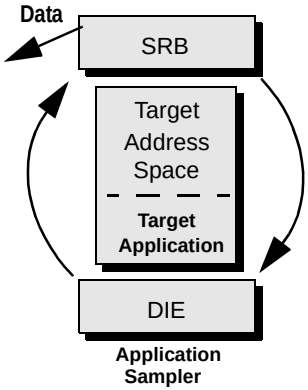

DIE/SRB Routines:

A DIE (Disabled Interrupt Exit) and SRB (System Request Block) are built as part of the common storage control block structure before the Application Sampler starts collecting data. Wherever possible, InTune runs in 31-bit addressing mode and above the 16-megabyte line. The only exceptions are the Sample Control and Csect Resolver tasks, which run in the InTune Server Space.

The total amount of common storage (ECSA) used by InTune is approximately 120K per waiting or active Monitor Session. The storage is freed once a monitor session ends.

Finding the Target Application

When the InTune Server Space is started, it dynamically installs a front end to ATTACH (SVC 42) using the OS/390 SVCUPDTE facility. When a new job step starts, InTune examines the ATTACH used by OS/390 to start the job step to see if any matching monitor sessions are waiting.

If a match is found, the Monitor Session Controller schedules an initial SRB into the target job step, starting the Application Sampler. If there is no matching job step, the Monitor Session Controller waits until posted by the InTune ATTACH (SVC 42) front end.

Note

The Application Sampler always treats the target application job step as read-only.

Sampling the Target Application

This is a dual phase operation by InTune. The first phase of the Application Sampler runs as a DIE routine. The second phase is an SRB routine.

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The DIE - Application Sampler Phase 1

A DIE is a high performance STIMER that is executed every several milliseconds, depending on the monitor duration and number of samples in the monitor definition. When the DIE expires, OS/390 is interrupted and the InTune exit routine saves the execution status of any executing program, then calls the associated DIE routine. InTune collects OLD PSWs for the target job step and other pertinent OS/390 information.

The InTune DIE routine has an instruction path length of about 300 instructions. By using a DIE routine to capture PSWs for the target job step, InTune ensures an accurate measure of where the program was executing, because the processor is disabled for interrupts. In a multi-CPU environment, InTune performs the same operation for all online CPUs.

The SRB - Application Sampler Phase 2

Once the PSW information has been collected by the DIE routine, the InTune DIE routine schedules an SRB into the target job step. When the InTune Application Sampler SRB receives control in the target job step, it scans all tasks in the address space performing three functions:

- **Resolving the addresses captured in the DIE routine:** The Application Sampler determines which load modules contain the PSW addresses. The load modules may be loaded either in common storage or the private storage area of the target job steps. Csect resolution within a load module is performed by the Csect Resolver task in the InTune Server Space.

- **Identifying where and why a task is waiting:** The Application Sampler will try to determine the specific cause of the wait for each task, such as data set waits, DB2 waits, program load waits, tape mount waits, and resource contention waits.

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Once it is determined why the task was waiting, additional wait related information is gathered. For example, if the program is waiting for a data set, InTune will attempt to find out which data set is involved, and what action was being performed on the data set. If the program is waiting for a program to load, it will try to determine the program name that was being loaded.

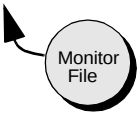
- **Gathering information about other address spaces servicing requests for the target job step:** This may include gathering the SQL statement from the DB2 DBM1 address space or locating additional information from the IMS DLI SAS address space.

The total instruction path length for the SRB is usually in the range of ten to fifteen thousand instructions. This varies depending on the number of tasks, types of waits, and other facilities used, such as DB2. This puts InTune's monitoring overhead between 1% and 3%. This can be adjusted by specifying a more focused set of monitor profile criteria. For example, if the target job step has 15 tasks running, and you are interested in only 1 of the 15 tasks, you can improve monitoring overhead by indicating the specific task to be monitored. InTune will ignore the other tasks.

Ending the Monitor Session

When a Monitor Session ends, the Monitor Session Controller frees the ECSA control blocks, and notifies the Csect Resolver and Sample Control tasks to finish and terminate. When the Monitor Session termination is complete, a message is sent to the InTune TSO Client Space indicating that the monitor session has ended.

Writing The Results to the Monitor Data Set



Since SRBs cannot allocate or write to files, the information is moved to the Monitor Session Manager within the InTune Server Space for augmentation and storage in the monitor data set. Inter-address space communication and data movement is performed using access registers.

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The purpose of a monitor session is to obtain information about the delays associated with an application. Once the information has been gathered, it is available for analysis.

The InTune interface running in the TSO Client Space has been designed to maximize the efficiency of finding the causes for delays. You can look at the data using several different views, using the Interactive Analysis Facility. See Chapter 7, “Analyzing Monitor Data” for complete information.

InTune and OS/390

InTune uses the latest generation of OS/390 documented facilities and techniques in its architecture for the collecting of application performance data, for the data movement between address spaces, for SYSPLEX support, and for interfacing with OS/390 itself. These include:

- Cross Memory Support using Stacking PC calls and Access Registers
- Cross System Coupling Facility (XCF)
- Named/tokens
- OS/390 Resource Managers

Cross Memory Support using Stacking PC calls and Access Registers

InTune uses the newer S/390 Stacking PC calls, thereby improving performance. Access Registers are used in moving data between address spaces minimizing common storage requirements and improving system integrity.

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Cross System Coupling Facility (XCF)

InTune allows you to view your entire SYSPLEX as a single system. You no longer need to know which OS/390 image within the SYSPLEX the application will execute. InTune will do this for you. The InTune Active Jobs panel has been updated to allow users to view executing jobs on all systems within the SYSPLEX.

Named/tokens

InTune Server Spaces now locate their control blocks and other information using OS/390 Named/tokens. InTune Server Spaces are now identified by an 8 character name, instead of a cryptic 4 character OS/390 Subsystem ID. Additionally, Named/tokens are dynamic in nature, minimizing OS/390 administration.

OS/390 Resource Managers

InTune now uses OS/390 Resource Managers for end-of-task and end-of-memory recovery. OS/390 Subsystem Exits are called for every end-of-task and end-of-memory occurrence, forcing InTune first to determine if the task or address space is relevant to InTune before continuing with the recovery operation. By using the newer OS/390 Resource Managers, InTune can indicate which tasks and address spaces it needs to protect instead of being called for all tasks and address spaces, thereby improving overall system performance and integrity.

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Glossary

This glossary defines BMC Software terminology. Other companies in the computer industry, such as IBM, publish dictionaries and glossaries that may be used in conjunction with this glossary.

Since this glossary pertains to all BMC Software-related products, some of the terms defined here might not appear in this book but may appear in other books documenting those products.

address space An executing batch job, system task, or TSO user. Same as *job*.

application tuning The process of analyzing and adjusting the performance of an application with the goal of maximizing efficiency and effectiveness.

AutoCustomization An online facility for customizing the installation of products. AutoCustomization provides an ISPF panel interface that both presents customization steps in sequence and provides current status information about the progress of installation.

BBLINK The BMC Software load library.

BBSAMP The InTune data set which contains sample members used for the installation and operation of InTune.

broadcast request An InTune monitor request that is sent to any system in a sysplex.

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CodeView	Interactive analysis option 3. Displays the execution and wait time of each module used by the target program.
Csect	An individually linkable component of a program, which may be included in one or more load modules.
Csect Associations	InTune allows a functional description to be associated with individual Csects that will be shown on various analysis panels. The user may thus build a database of functions of Csects, which may substantially simplify the later understanding of the presented results.
connect time	The number of milliseconds during a monitored period that represent the end-to-end time needed for transferring data to and from external media and memory. Connect time is displayed on the DataView and Dataset Details panels. Connect time might exceed the monitored period because of data overlap caused when multiple blocks of data are moved to and from memory.
contention	Occurs when there are more requests for service than there are servers available. For single servers such as drives, control units, and paths, contention occurs when two or more requests for service arrive simultaneously.
content-sensitive help	Online help information for specific Csects, Pseudo Groups, and major and minor delay categories.
data set fragmentation	Under OS/390, data sets are allocated in the form of extents, which represent allocation areas on the physical device. A data set may originally be allocated occupying from 1 to 5 extents and may subsequently grow into up to 16 of these allocation groups. The more scattering occurs, the more a data set is considered to be fragmented. Since data retrieval time increases with fragmentation, this characteristic is considered undesirable.
DataView	Interactive analysis option 5. Displays data sets, databases (IMS, Adabas, and CA-DATACOM), and DB2 statements which caused activity during the monitored period.

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DelayView

Interactive analysis option 2. Displays the target program's performance in terms of the activities which comprised the program execution time.

delays

InTune considers all samples that do not indicate the actual code of the target application program to be processing as some form of delay. This term should not be confused with actual waits and is only a functional indicator from the perspective of the operating system as to what operations are performed at the time of the sample. Delays may cause the task to be in a wait state, executing in RB (application program) or SVRB (operating system) mode.

disconnect time

The time period in an I/O cycle that a device is not actually transferring or searching for data.

external data set

Monitor data created by another InTune user.

fast path

A predefined link between one screen and another. Executed by placing the cursor on a single value in a field and pressing **Enter**. The resulting screen displays more detailed information about the selected value.

field

(1) A column of data on an InTune screen. (2) A group of character positions within a screen used to enter or display specific information.

field help

Online help describing the purpose or contents of a field on a panel. Displayed by placing the cursor anywhere in the field and pressing **PF1** (HELP).

filter

Selection criteria established for a column of data. Data that does not meet the selection criteria is not displayed. A filter is comprised of a character string.

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filtered analysis	When requesting InTune to analyze the gathered data, the user may indicate that the output data should be filtered before making it available. This process temporarily discards all data pertaining to involuntary waits, which, in most cases, are not under the control of the monitored program but quite often represent a considerable amount of data that slow down the interactive analysis. This method is preferred to the basic (unfiltered) analysis.
fixed fields	Fields that are located on the far left side of an InTune screen that you display by scrolling right with PF11 (RIGHT). The presence of fixed fields is indicated by an arrow on the left side of a screen, just below the column headers.
FTSTART	The REXX EXEC used to invoke InTune.
histogram	InTune uses the term histogram to refer to a process where the activity of an individual load module or Csect is statistically broken up into segments of equal size and their activity comparably demonstrated.
Installation Verification Procedure (IVP)	A procedure which is performed upon completion of installation which determines if InTune is functioning properly.
interactive analysis	Analysis of data that is processed from a user's terminal. This form of analysis is preferable since it allows selective presentation of output and reduces the amount of user data. Several report display options are provided.
InTune reports	InTune generates printable reports from most of its panels. These reports generally represent the complete information normally obtainable by scrolling through the current display but may add additional secondary information. These reports are sent to a DD statement and class-defined in the user's profile.
InTune Server Space	The server for all monitor requests issued by InTune users on a system.
InTune TSO Client	The online InTune interface, used to define, invoke, analyze monitors.

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INTUNESS	The procedure for starting the InTune Server Space.
invoking a monitor	The process of starting the sampling of a target application as defined by the *monitor definition.*
involuntary wait	InTune considers all non-dispatch states that are not directly caused by the target address as involuntary. This includes such states as the address spaces being swapped out or not being dispatched due to higher priority work already being in the system.
job	A batch job, started task, or TSO session executing in an OS/390 address space. Same as *address space.*
load module	Almost all code executed under OS/390 is stored and fetched by the operating system in the form of load modules. Load modules are comprised of individual Csects and information about how these Csects are to be loaded into memory and resolved.
local request	An InTune monitor request that is only sent to the local system of the TSO user.
module load time	The amount of time the operating system spends retrieving and resolving the instruction image of a load module stored on DASD.
ModView	Interactive analysis option 7. Displays the activity of each load module for the target application.
monitor administration	The management of monitor information, including monitor definitions, invocations, analysis, history, and status.
monitor data set	The PDS which contains the results of an InTune monitoring session.
monitor definition	The specification a user provides to InTune as to what to monitor and in which fashion. A user may maintain any number of monitor definitions at any given point in time.
monitor history	The cumulative collection of data sets for a monitor definition.

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monitor request	A monitor definition that has been activated using the I(nvoke) line command in the Monitor Request Overview panel.
multitasking	Simultaneous or quasi-simultaneous processing of several units of work (tasks) within the same address space. Each of these tasks operates on independent processes, which may or may not preempt each other.
Open Application Program Interface (Open API)	The method inTune uses to define and invoke monitors from outside of the InTune TSO Client (via TSO commands, batch jobs, or from within a program).
Overview	Interactive analysis option 0. Displays information about the monitoring process, as well as key global statistics about the monitored application.
pending time	The time between the successful completion of an SSCH and before the execution of the first channel command. Pending time and IOS queue is the total queue time (XA only).
PoolView	Interactive analysis option 8. Displays statistics on IMS OSAM or VSAM/LSR and VSAM/GSR buffer pool usage.
Primary Option Menu	The panel displayed when InTune is first invoked. Provides access to all of InTune's basic features.
profile name	The name specified for a monitor definition. Identifies monitor data sets and analysis panels.
profile parameters	A set of parameters which specify default conditions for each InTune user.
pseudo groups	A feature that enables you to assign unique identifiers to related program modules that cause InTune to treat them as a single group during a monitor session. Modules are associated with Pseudo Groups with Option 4, Pseudo, on the Primary Option Menu.

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registration	The process of providing InTune with the location of compiled program listings. Used to relate program activity to actual high-level language statements during analysis.
samples	The collective information gathered by all snapshots during one InTune recording interval. This information consists of snapshots for all active and monitored TCBs in the target address space.
SBBHELP	The data set which contains InTune online help and content-sensitive help information.
screen	A collection of rows and columns of data displayed through InTune's online facility.
screen help	Online help panels describing the purpose of a screen. Display screen help by placing the cursor anywhere on the screen, except on a field, and pressing PF1 (HELP).
snapshot	The capture of the state of one task in the target address space with any related information. This includes, but is not limited to, the PSW, the wait state bit, the module active at the time, and some of the information pointed to by the current and stored registers.
status	(1) The percentage of completion of a monitor request. (2) The status (Active, Inactive, Waiting) of a monitor request in the InTune Server Space.
target request	An InTune monitor request that is sent to a specified system (or systems) in a sysplex.
tasklib	A DD statement other than STEPLIB or JOBLIB from which a program explicitly initiates the fetch of load modules. The name of the DD statement is at the discretion of the program and varies widely. Examples are DFHRPL for CICS and ISPLLIB for ISPF.
TaskView	Interactive analysis option 1. Displays information about the performance of each OS/390 task in the monitored address space.

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TimeView	Interactive analysis option 4. Displays program activity in time sequence. Each row of information represents a single sample taken during the monitored period.
TranView	Interactive analysis option 6. Shows IMS or CICS activity in terms of individual transactions.
TSO Client	See *InTune TSO Client.*
TUNAVSAM	The procedure used to create the InTune Global Tables data set.
TUNBATCH	The procedure used by InTune for generating batch reports.
TUNCALL	The program used to invoke InTune monitors from outside of the TSO Client.
TUNCOB01	The COBOL program provided with InTune which is used to verify operation and generate sample monitor data.
TUNSDEFS	UBBPARM member used to define system default parameters.
TUNSSP00	UBBPARM member used to define Intune operational parameters and for password authorization.
TUNUDEFS	UBBPARM member used to define user default parameters.
UBBPARM	A data set created during AutoCustomization into which samples are copied from BMC Software's BBPARM or PARMLIB data sets. Users can then modify their own copies without corrupting the original models.
VOLSER	Volume serial number.
volume	A named collection of data sets dealt with as an entity by the I/O supervisor. For tape subsystems, it is a reel of tape. For DASD, it is a drive, a logical drive (dual-density), or an actuator (3380 class).

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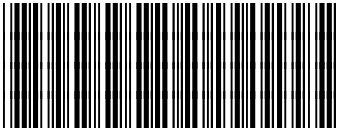

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